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AVIATION

The Oldest American Aeronautical Magazine

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REVIEW OF EVENTS AT *Detroit*

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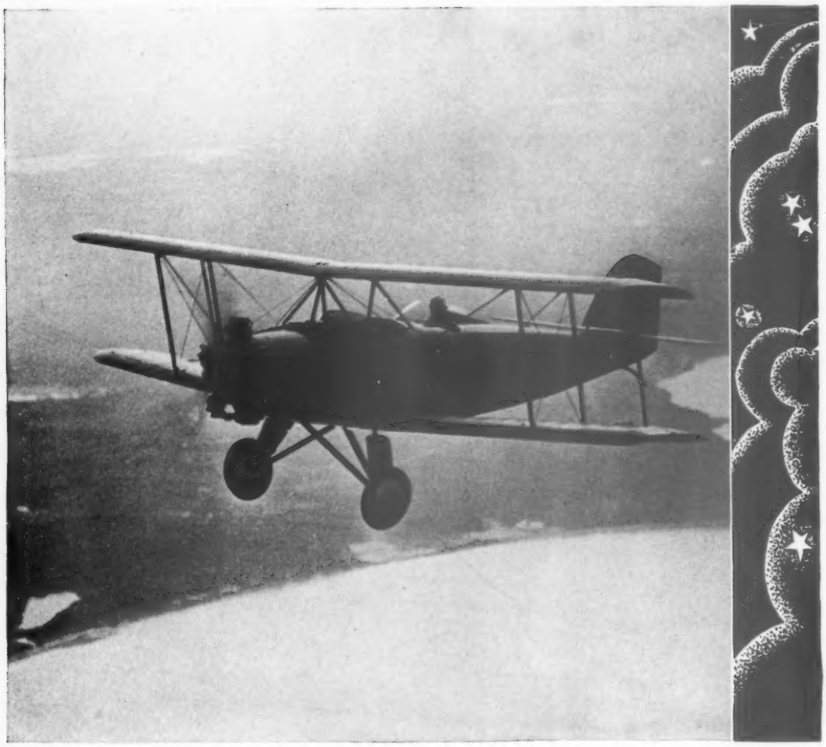

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Leslie E. Neville
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AVIATION

The Oldest American Aeronautical Magazine

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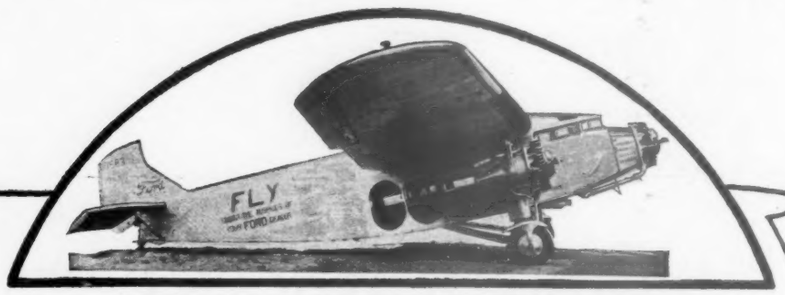

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A greater number of the fields that we operated from had untreated dirt runways and in dry weather our three motors blew up clouds of fine sand and dirt. This was particularly bad for us because of the great number of take-offs and landings that we made each day; our average flight being 15 minutes. In spite of this hard service, however, we found when the motors were torn down during each of the three overhauls, that there was a decided absence of the usual sludge; also that the bearings each time were in perfect condition and even at the third overhaul, did not show any appreciable signs of wear.

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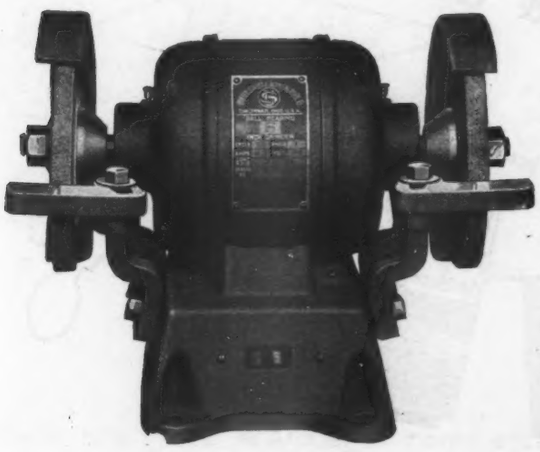

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"skyways" are becoming highways

*Figures compiled by Aeronautics Branch of U. S. Dept. of Commerce.

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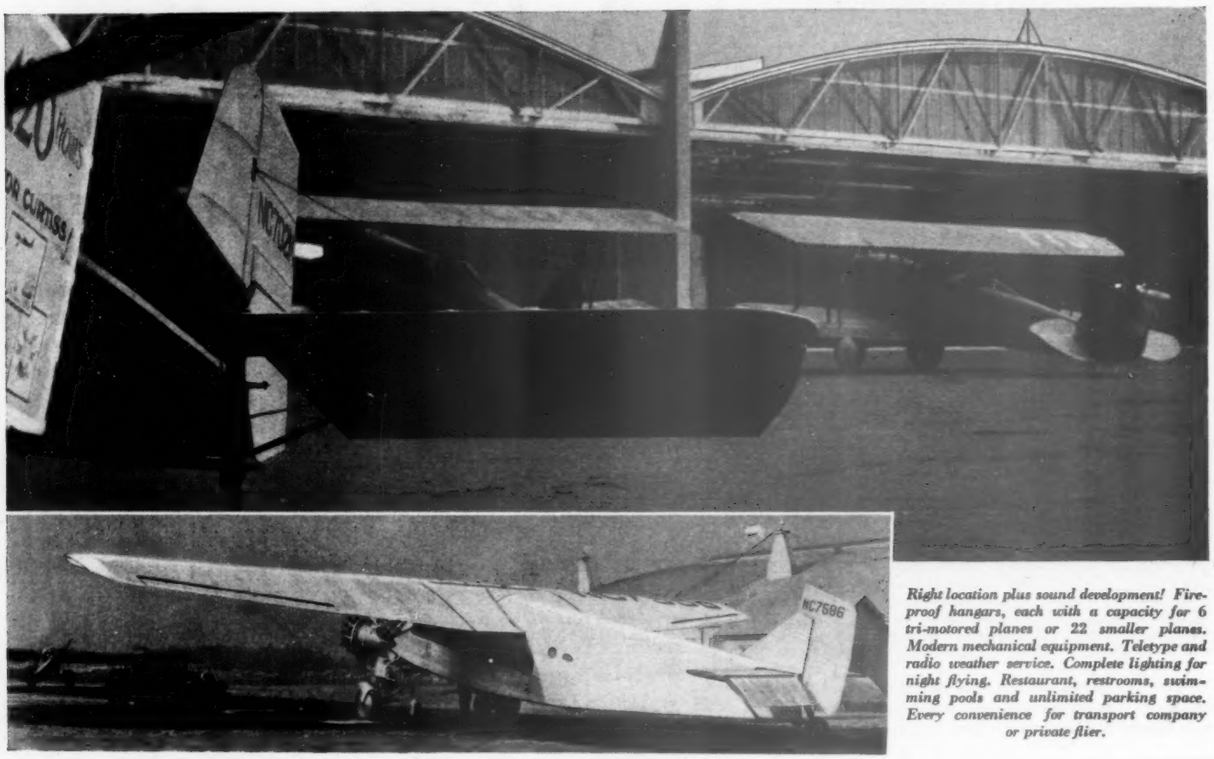

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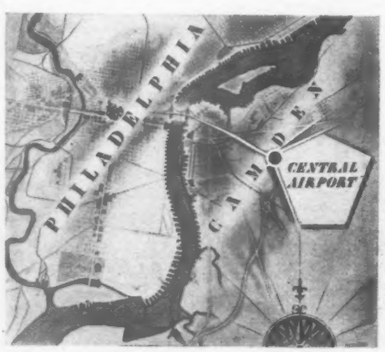

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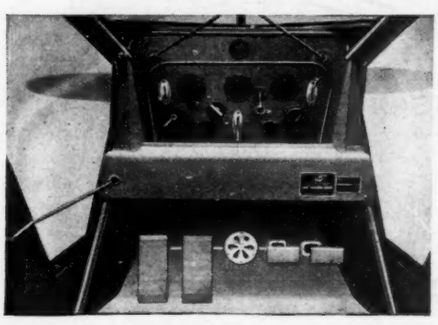

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Handsome, sturdy, built to Curtiss-Wright standards of airworthiness and performance, the 1930 Robin—four-place—meets the most exacting demand for economical airplane service, yet possesses refinements and appointments heretofore associated only with the most costly and most luxurious air liners. In all branches of commercial use, the new Robin will bring a new pride of possession both in flying pleasure and greater profits earned.

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AVIATION

THE OLDEST AMERICAN AERONAUTICAL MAGAZINE

A McGRAW-HILL PUBLICATION . . . ESTABLISHED 1916

EDWARD P. WARNER, *Editor*

VOLUME 28 . . . *April 19, 1930* . . . NUMBER 16

The World Is NOT *Coming to an End*

AVIATION sent its first copy from the presses fourteen years ago. In fourteen years of sharing the triumphs and tribulations of the aircraft industry, we have never encountered more defeatism than at the present time. Business has slowed down. It has slowed down badly, but we refuse to admit that there is any excuse for celebrating that fact by prophecies of immediate and complete disaster. Admitting that an excess of optimism was rampant over a considerable period in 1928 and 1929, the appropriate measure of convalescence from that state is a re-establishment on the solid ground of plain facts and sober judgment. We cannot correct for an unreasonable optimism at some period past by launching ourselves into an equally unreasonable delirium of pessimism.

Let us be frank. We have had a boom, backed by an abnormal public psychology. Other industries have encountered that same thing many times in the past, and there has never been but one outcome—a recession varying in dimensions between a very pronounced let-down and a major slump. We need not flatter ourselves that our own experiences are unique. Others have survived the slump and gone on to new prosperity, and so shall we.

We do not suggest that this cheery willingness to believe that all is lost is universal. It is not even general, but it is not as rare as it should be. Discouragement is not only no substitute for effort, it is not even an incentive to it. Among the slogans for which the aircraft industry has no need at the present time, high rank goes to: "It can't be done," and "The public is down on us."

Let us be frank. What have we to sell? We have the fastest—incomparably the fastest—form of transportation ever known to man. It is unique among means of overland communication in its ability to be completely independent of prepared roadbeds. It is, in the long run, bound to be appreciably more costly than surface travel, especially when the private ownership and operation of a plane is in question. Private operation is, in the state of the present comparatively limited development of surface organization, often subjected to some perfectly unnecessary inconveniences. It is appreciably more dangerous under average conditions than other means of travel, but with proper equipment and organization and the most competent personnel the danger can be made small enough so that it should not prove a deterrent. Finally, air transport, like that upon the water, is less reliable than the movement of land vehicles, more subject to interruption by unfavorable weather conditions.

There in twenty lines is a summary of our inherent position. There is a broad market for the advantages that the airplane has to offer, even when the present disadvantages must be admitted. As progress is made towards overcoming the drawbacks, and some of them can be very largely overcome by competent management and organization without requiring any new technical development, the market grows.

The airplane business for 1930 is not going to show the percentage of increase over 1929 that came to be the established standard during the three preceding years. That ratio of advance could not continue indefinitely in any case. The whole history of industry afforded no precedent for such a thing. Business for 1930 may in the aggregate appreciably exceed that for 1929. It may fall somewhat below it. We can speculate, but it is too early to reach any definite conclusion. Even if it does fall below, however, we shall still be far from mass disaster. The airplane will still have something to offer that the public needs. Increased speed in transportation has never yet been consigned to the dust-bin. There will be waves of acceleration and depression, but this industry as a whole is bound in the long run to stay

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on the upgrade. This is a good time, and the counsel is addressed especially to those who are allowing themselves to feel downhearted not only about their own prospects but about the whole industry of which they are a part, to look back several years, and ahead at least two or three, and try to regain and to retain a perspective.

//

Short-Haul Aviation

ONE OF the most significant recent aeronautical developments has been the rapid establishment of air ferry lines. Such services have been undertaken in Seattle, San Francisco, and other American cities. The immediate volume of the general public's response has been a sufficient proof of the real service that is being rendered. For the most part these air ferries actually operated over the same general routes as the established ship ferries, using amphibion planes with waterfront terminals so close to the centers served that it is often possible to cut the time required by the surface transport system in half, even though the air distance be as low as six miles, as it is across San Francisco Bay.

Air Ferries, Ltd., of San Francisco, carried 11,378 passengers during the first 30 days of operation. After 30 days a traffic check showed that 35 per cent of the passengers had used the Air Ferries before and were becoming "habitual" passengers. The check further revealed that 71 per cent of the passengers using the service were bound on business errands rather than just being out "joy-hopping," that 37 per cent chose the air ferry in preference to other means of transportation because they were in a hurry, and that 5,400 persons were carried during the first month who had never been up in an airplane before. It is hard to estimate the value of those 5,400 initiates to the continued progress of air transportation. It is even harder to evaluate the tremendous impression which that aerial shuttle service must create among the thousands of passengers on the water-borne ferry-boats, as they see the air ferries slip swiftly past them day after day.

The most encouraging aspect of the air ferry development is the vast field now ripe for the establishment of such services. While air ferries have been inaugurated in but three or four of our larger municipalities, there is an evident field for them in at least twenty American cities. The rapid expansion possible in each center is well illustrated by the history of San Francisco's aerial ferry, which started with three amphibion planes and now plans to have at least twenty in operation by mid-summer.

The amphibion plane, with its ability to land in water areas close to the centers served, and to climb up runways to a dry float for the rapid transfer of passengers, has made ferry service possible. Wherever the physical characteristics of a metropolitan area are such as to make it possible for the airplane, either amphibion, flying boat, or landplane, to save a material portion of the time spent in local travel by a majority of the populace, there is a field ripe for the air ferry.

It is gaining rapid recognition because it renders a definite and valuable service. For itself, it handles a substantial portion of the daily local traffic in the areas served. For the rest of the industry it is taking new thousands of persons into the air each month, selling them the safety, reliability, and commonplaceness of air travel, and building up a vase reserve of potential passengers for all forms of air transport.

Air ferry operations are particularly significant because they demonstrate that the airplane is readily accepted when it renders a real service. Like all other aeronautical activities, they will receive public acceptance in direct ratio to the genuine economic value of the service rendered.

//

Yeast for the Mass

PRIVATE FLYING clubs on an organized basis have on the whole, with certain happy exceptions, been sorry failures when tried in this country. Heralded as the vehicle by which the popular market for airplanes would arrive, the flying club has failed to carry its weight. If private flying is to be popularized we must have a strong and virulent nucleus around which such flying will cluster and grow. The mass interest in flying must be leavened by the powerful yeast of a strong chain of active flying clubs.

Attempts to organize the flying club movement have run into special difficulty because we have generally gone too far afield. Most club attempts have been based on an effort to sell planes to a group not yet actively engaged in aviation or flying activities. If there is to be a strong flying club movement built up we should first turn within and establish such clubs among those most actively interested in, and already engaged in, aviation.

Of course the heads and executives of aeronautical concerns of all sorts should set the example by taking an active part in the flying club movement. They can afford to do it and the duty is plainly theirs. If we do not fly ourselves, we cannot expect anyone else to do so. There is available, however, a wider field for immediate flying club organization among the rank and file of the employees of all aeronautical concerns, including not only the aircraft and engine manufacturers, airport, air lines and distributors of aircraft, but also the oil companies, rubber companies, and all others closely allied with the aeronautical industry.

Such flying clubs among employees should be subsidized by the employer to the extent, at least, of supplying

equipment and training at cost. The employees would be given the opportunity of actively engaging in flying at a price within their ability to pay. The effect on the market would be to increase slightly immediate sales, materially increase the total volume of flying, and to stimulate private flying generally through the activities of the club members and their work upon their friends. Employees would feel themselves a definite part of aircraft production as they never can on any other terms, and factory morale would benefit correspondingly.

Financing and insurance would, of course, be handled through the employer and a direct salary levy would represent a comparatively painless method of collecting dues. The time may well come when participation in regular flying activities will be made compulsory for all employees above the very lowest ranks. All those who are earning their bread and butter through a connection with the aviation industry share a direct duty to build up that industry in every possible way. The acceptance of such a plan by the industry, and its consequent development, would give us a skeleton upon which to build a popular flying club plan extended to the general public. Any doubt or uncertainty as to the ventual success or failure of flying clubs outside the aviation industry, based upon experience to date, has nothing to do with the present case. The opportunity is at hand to start a strong flying club movement. The industry can do the job. In its own interest, the industry should.

//

To Fly or Not to Fly?

FOR THE MOMENT, the passenger air lines of the United States have relatively little grievance against their traffic. On the long-run basis it is still far short of being adequate, but its proportions have increased so generously in the last few months that there is hardly likely to be any better time than the present for trying experiments which may make slight temporary inroads upon the passenger list. With rates at their present level the air lines can well afford to lose a single passenger for a single trip here and there, if by so doing they can make a lasting friend for the future.

Air travel still falls rather badly short of perfect reliability. We freely recognize, talking among ourselves, that we cannot fly in certain types of bad weather, and that the attempt to do so would be fraught with increase of hazard. We not only recognize that fact among ourselves, but the public recognizes it, with increasing force as the number of people who have had a reservation on a plane and then found that it was unable to get through on schedule mounts with the mounting patronage of the air lines.

Since the aviation industry recognizes the fact, and since the general public recognizes it, why not, so to speak, admit it to each other? Why not admit it before the fact instead of expressing regret afterwards?

Obviously, it is often impossible to tell in advance with any certainty whether or not a trip can be made. Equally plainly, weather conditions and the weather maps often show a couple of hours before the flight, or even over-night, that it is almost certain that the flight will or almost certain that it will not be put through without a hitch. That information is now compiled and interpreted, as rapidly as it becomes available, for the operating organization. The prospective air traveler ought to be let in on the secret.

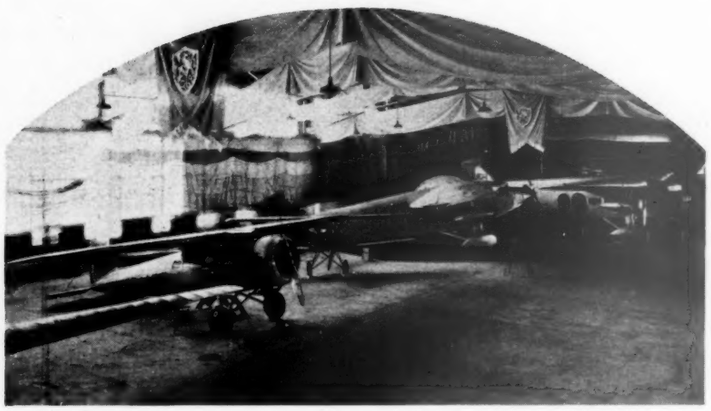
Frequently we have had occasion ourselves, as innumerable travelers not connected with the aeronautical industry must have done, to balance in our minds the relative desirability of taking the train to a distant city tonight or the airplane tomorrow morning. If it was of extreme importance that the schedule be made we have been likely to end up by taking the train, particularly during the winter months when bad weather is more than ordinarily common. We should have been far more disposed to wait upon the airplane, which would have been much more convenient, if we could have telephoned the office of the air line the previous evening and had a candid assurance from an apparently well-informed official that the weather maps presented no sign of trouble impending and that the chance of going through on schedule the following day was well above the average for the season.

Some air lines will give such information to the ordinary traveler now, but others, we fear a majority, will not, preferring to put off his inquiry with vague and platitudinous and obviously uninformed assurances. Admittedly, to give out the bad news when weather trouble is likely, but by no means certain, would mean the loss of certain passengers and the possible necessity of making the trip with a light load if the weather cleared up and permitted of getting through after all. We are very confident that that sacrifice would be compensated for by the increased confidence that the passengers would feel when the forecast was favorable, and by the making by air of certain journeys at present made by rail because the weather hazard is considered too great to assume.

Admittedly, also, some care would be necessary to avoid anything in the nature of a guarantee, or any creation of legal liability in the event that a favorable forecast of successful completion proved to have been unjustified. We have enough faith in the resourcefulness of counsel for the air transport lines to believe that they can circumvent that obstacle. What the American people want of air transport at present is to know exactly what it can get. They would, taking them as a whole, much rather accept a reduced speed or certainty of service, provided they were warned in advance, rather than to feel that implied promises had been made which could not be kept. This is a good place to start telling them, so far as our own knowledge permits, just what they can expect of each individual trip.

HERE AND THERE AT THE Detroit Affair

Thumb Nail Sketches of



The Consolidated and Ford exhibits. Note the suspended tri-motor in the background and the "Fleetster" in the foreground.

TWO YEARS AGO the Detroit Board of Commerce and local aeronautical officials staged an aircraft show that brought forth much praise from the industry. One year ago a second show was held, and again the industry salaamed to airminded Detroit. Last week a third show was put on and the industry finds itself high and dry for the want of suitable adjectives to describe its admiration of what Ray Cooper and his associates have accomplished in the Motor City. Perhaps it was the result of double experience, or perhaps it was the result of increased cooperation on the part of Detroit taxpayers, or perhaps it was the result of both. But at any rate, the Third Annual All-American Aircraft Show may well be regarded as the most attractively staged aeronautical exposition in the history of the science of aviation.

For many years the industry has longed for the opportunity to show the prospect its wares on the floor of the show, and then take him outside the building and demonstrate the product in the air. At Detroit the opportunity presented itself, for the show was held in the main hangar and exposition building at the Detroit City Airport. That, of course, was one of the main features of the affair both from economical and financial points of view. Heretofore, exhibitors at aircraft shows have been forced to fly their products to the nearest airport, knock them down, cart them through the streets of the city, and then assemble them again in the exposition building. At the 1929 Detroit show the average cartage expense alone was $40 per plane. Add that figure to the time cost of knocking down and assembling and the result is an item of considerable importance, particularly to the small manufacturer.

This year's show, however, permitted the exhibitor to side step that expense, for with the exception of one or two planes, every one was flown to the airport, drained of gas, polished up and wheeled into position in the exposition building, and that, incidentally, included the Fokker F-32.

However, it seemed quite evident that what the exhibitors saved in the cost of getting their planes to the building they spent in additional decoration of their respective booths. The Airplane Division of the Ford Motor Company, for example, set out to eclipse all previous records. One half of the Company's floor space was taken up by two Ford transports, one of them powered by Packard Diesel engines. The other half was a bird's eye view of Ford Airport and surrounding territory from an altitude of about seven thousand feet. On the floor was mounted a papier maché relief map made to scale and with no detail missing from the Ford factory to the telegraph wires strung along the railroad track. Suspended above all that was a Ford transport with propellers turning over. When one viewed that giant transport one realized more than ever what a splendid job the engineers did when they built that main hangar.

Slightly less elaborate, but perhaps equally effective were the exhibits of the Stinson Company, General Motors (Fokker) and the Detroit Aircraft Corporation. Each of these three progressive companies showed their full line, which was arranged so that there was plenty of "eye appeal." As a whole the accessory exhibits were well placed and well decorated. Perhaps it was because of the size of the show place, but anyway it seemed to us that there were fewer accessory exhibitors than in shows gone by. One thing, however, that was particularly pleasing was the absence of companies that have nothing worth offering the aircraft industry. The most popular exhibit of the power-plant group was that

By
R. SIDNEY BOWEN, JR.
Associate Editor of AVIATION

General view showing Laird, D.A.C., and Stinson exhibits

the Exhibits and Activities at the Third All-American Aircraft Show

of the Packard company, which made its first public showing of the long awaited Packard Diesel engine. The Kinner company also received its share of attention with its novel display and the Pratt & Whitney Company and the Aluminum Company of America had the same artistically decorated displays that they had at the St. Louis show.

Although official figures are unavailable at this time it is fair to assume that new aircraft show attendance records were hung up during the show period. The fact that both stationary and flying planes were on the menu had a double appeal for the visitor, and he and all his relatives and friends trotted out to the show in force. It has been stated that the airport is but fifteen minutes from the business district of Detroit. Perhaps it is, if one considers it fifteen minutes by rifle shot. However, the port is exceedingly close to downtown Detroit and there are not to our knowledge many other ports so well located. What is unfavorable in distance is made up for in means of transportation. The port may be reached by either street car, bus or taxi.

The field itself, which was described in the April 5 issue of AVIATION, needs no further comment here, other than that it is all that Detroit promised, and was operated to the entire satisfaction of the visiting pilots. The flying rules were adhered to remarkably well and there were very few violations.

A view of the attractive Packard Diesel display

SO MUCH for what was available. Now for a few words regarding the extent to which the industry took advantage of the opportunities presented.

Long before the opening date it was announced that the Detroit affair would be a merchandizing event. In order that plane manufacturers could devote major effort to getting signatures on the dotted line, or at least a list of promising trade and civilian prospects, a minimum number of trade meetings were scheduled. The airport was made available for demonstration flights, and the Show Committee arranged all sorts of attractions to get the public out to the show. The public did come out, but the industry failed miserably in its attempt to take advantage of the exceptionally unusual opportunities presented. In fact it was our impression that there was a minimum of effort on the part of plane manufacturing representatives to go after sales.

And our impression was not gained from hearsay, but from actual observation and experience. With the idea in mind of determining how the business of selling airplanes was progressing we put on our airminded face. took off our Q.B. pin and toured the show at intervals for four days running. We climbed into planes and climbed out of them. We picked up literature and read it with interest. We patted propellers and peered up under the cowling at engines. We joined the Ancient Order of Fabric Feelers and snapped wings and wires. We did everything that we believed a prospective purchaser would do, but we received no attention, except from our friends in the industry, most of whom we succeeded in dodging during the selling inspection tour.

And we were not alone in that effort either. A few of our friends did the same thing. But the result was the same. Not once were we asked if we were interested in aeronautics. Not once were we asked if there were unanswered questions in our mind. Not once were we asked if we would like to buy a plane. We were

spoken to, we admit, and on four occasions. But each time it was an order in no uncertain terms to get down off a fuselage step, and to stay down. There were countless youngsters in short pants who got the same order, so after all, perhaps we *do* look too young to learn to fly.

But that is beside the point. How in the world do manufacturers expect to sell their products at shows if they totally disregard the visiting public? Ninety-nine out of every hundred people who stopped before an exhibit perhaps didn't have enough money to buy the prop, but it is fair to assume that the one hundredth had enough to buy the whole plane. He, however, like the other ninety nine, had little opportunity, if any, to learn any more about the plane than what was printed on display placards, or contained in advertising literature. And there was an alarming scarcity of that. Even price tags were few and far between.

If it is to be the style for salesmen at aircraft shows to ignore the seemingly interested public, then that public should at least be allowed to inspect the planes at close quarters, in fact sit right in them if it is so desired. Had that been the case at Detroit we feel confident that more sales contracts would have been signed and sealed. Unfortunately, though, it was not

The Bellanca exhibit with Lockheed in the background

the case. At the majority of exhibits, any visitor who started to swing a leg over the cockpit was immediately pounced upon by the nearest salesman and more or less told to be on his way. Some planes were almost hidden behind "Do Not Touch" signs. And it was practically impossible to get into any of the cabin jobs on exhibit, for although some of them were open to inspection they were well occupied by salesmen and their industry friends talking over old times, or perhaps, the best ways to sell airplanes during 1930.

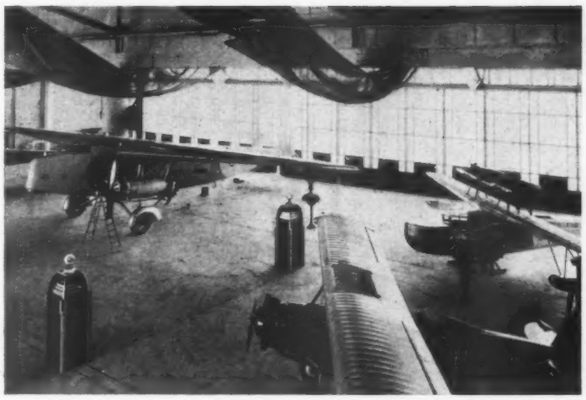
HAVING TAKEN part in more than one aircraft show, we can appreciate the worry and annoyance that ten thousand airminded kids can cause the plane exhibitor, to say nothing of the accessory man displaying small objects that fit one's pocket. However, there is no reason to adopt and enforce a "like son, like father" policy. At an automobile show it is all one can do to keep out of a car, but at an air show it seems to be all one can do to get near a plane. Plane manufacturers proclaim all sorts of things about the sturdiness of their products and at aircraft shows they guard them from the hands of the public as though they would crumble like so much dust at the slightest touch. Such procedure is neither logical nor profitable.

The youngsters can be watched by the salesman on duty. And if the exhibit is too large for one man then put more than one man on the job. But let the grown-ups inspect the planes to their hearts' content. Let them get in and work the controls if they wish, and while they are doing that, stand by them and volunteer a little information. It was tragic the way kids and old folks alike were bellowed at by salesmen at the Detroit function. Incidentally, singling out the youngsters for the second, it might be mentioned that the "less than 16 yr. of age, accompanied by adult" rule that was supposed to have prevailed at Detroit was broken as completely as was the treaty neutralizing Belgium. On Sunday the sixth, when some 48,000 persons passed through the gates, the place was packed with kids. If all of the visitors that day were placed side by side it would be found that every third one was a smudgy-faced youngster carrying under his arms everything that was not nailed down.

A SELLING FACTOR that was missing at Detroit, and which may be considered unimportant by many, was the presence of women salesmen. We admit that members of the fair sex are not found in any great numbers at automobile shows, at least not found serving in the capacity of saleswomen. Perhaps they are not needed by the automotive industry, because the lady of the house has accepted the four wheel means of transportation. But when it comes to the aircraft industry, we feel that the story is a bit different. The daughters of Eve have not accepted aviation in the same manner that their husbands, if any, have accepted it. In fact we make so bold as to venture that it will be a harder job to sell air transportation to the mother of the family than it will be to the father. However, we hope that we are wrong.

Nevertheless, right or wrong, it might be a good idea to have a feminine member included in the booth personnel so that the visiting ladies will be appropriately served. But if it must be a stag affair, why not address the lady as well as her escort? One event at Detroit stands out very clear in our memory. A gentleman and a lady had, by some means unknown to us, attracted the attention of a salesman. They did even more than that. They succeeded in getting him to answer questions. The salesman, though, addressed all of his answers to the man and paid not the slightest attention to the lady present. Eventually he worked the man away from the lady and began to show him some other features of the plane. The result was that the lady soon grew tired of viewing the general surroundings and began to tap the toe of one shoe on the floor and shoot not particularly pleasing glances at the salesman and his prospective customer. If that was good salesmanship then we apologize. However, the gentleman and lady happened to be married and so we're willing to take any bet that a sale was made that time.

Although it is well known by all salesmen, and is perhaps repeating a time-worn fact in salesmanship, we risk criticism to mention that the lady of the house has a whole lot of say on how and where the man of the house spends his money. The automobile men know that and today the American automobile is the way the woman wants it as well as the way the man wants it. In the design, color and interior of the modern plane there is some indication that the manufacturer is



Showing the Fokker F-32 (left), the Towle flying boat (right), and the Stearman mail plane (center)

appealing to feminine tastes. But what little appeal there is will fall flat if salesmen do not remember that the lady of the house needs more selling that does the man.

Speaking of sales, the Detroit show was vastly different from any other show that we have had the good fortune to attend. Usually it is reported or rumored that the entire year's production of at least five manufacturers has been sold before the curtain falls on the third day of the show. But at Detroit it was not until the third day that a plane was even rumored to have been sold. And in that particular case the rumor was correct. A plane actually was sold at the show, believe it or not. Of course other sales were made before the lights were turned out on the last day, but one left the show with a feeling that for the first time in history show exhibitors had stuck pretty close to the truth in their show sales statements.

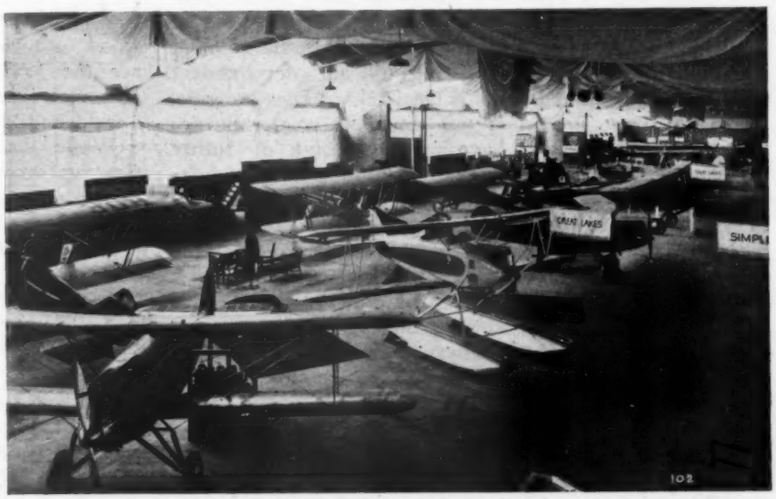
Besides what cash sales were made inside the exposition building, additional revenue was obtained on the field. The well-known joy-hopping barkers were exercising their lungs all the time, and from the observations we were able to make, a profitable time was being enjoyed by all. Incidentally, the weather during the first few days did not add to the number of five-dollar-a-hoppers. One day snow was among the elements present and for two days following that a cold raw wind helped to keep many people in the exposition building. Whether or not that was unusual weather for April in Detroit, it might be worth the time to consider a possible later date for the holding of Detroit's annual aerial affair. Particularly in view of the fact that there will be more and more demonstration flying as time goes on.

Before leaving the flying end of the show, it might be interesting to know that it was not imperative for planes on the field or in the exposition building to leave the scene of action at the close of the show. At all other shows the exhibitors had to pack up and get out as soon as possible as the shows were held in places that are available for other affairs. But at Detroit the exhibitors were able to store their planes in the exposition building as long as they wished, and only the usual hangar rental fees (based on wing span) were charged.

THERE WAS another thing that was quite conspicuous at Detroit as compared to aircraft shows of the past. In fact there were two things. First, the absence of many faces well known in aeronautics. Perhaps many of the missing remained so because of the slump that hit the industry last year. Perhaps some of them will be officially missing for many shows to come. We are inclined to believe that to be the case. But perhaps they were missing because of their reluctance to devote any more time and money to aircraft shows during 1930. Then again, perhaps they have chosen the New York show in May instead. But at any rate, there were many of the "old hands" among the missing. The St. Louis affair was a manufacturers' show while at Detroit it was frequently a case of distributor exhibiting.

The second item was the marked decrease in aircraft show night life. In the past most every hotel room was open house to all who cared to stop in. And it remained open house throughout the week. At Detroit there was very little of that sort of thing. An atmosphere of seriousness and business was prevalent from the lobby to the roof-garden. Hotel suites were serving for real business discussions. Whether it was due to the missing being missing, or whether it was due to the fact that new hands are on the industry's throttle we can not say at this time. However, there were many Detroit hotel managers who this year expected gray hairs but did not get them.

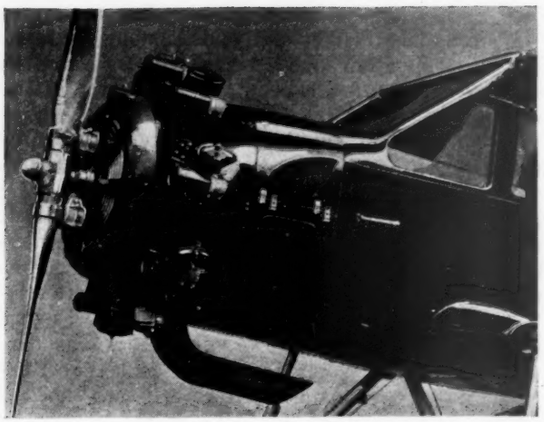
The nearness of the lunch hour reminds us of a particularly important feature of the Detroit show. For years we have been trudging about aircraft shows, sustaining ourself with hot-dogs and chocolate bars between breakfast and dinner. At Detroit there was a well appointed restaurant, cafeteria and lunch counter right in the exposition building. What it may have lacked in quality of food it made up for with the opportunity to rest one's feet after miles of cement floor and tripping over sprinkler system outlets. Indeed we look forward with great joy to the day when an aircraft show committee will have a show appropriation of a size to permit the laying of plush carpets. Then and then only will an aircraft show be a complete success.



A general view of the Great Lakes, Alexander and Nicholas-Beazley exhibits at the 1930 All-American Aircraft Show

PLANES, ENGINES AND ACCESSORIES AT THE Detroit

A General Survey of the 1930



Installation photograph showing the use of the Packard Diesel engine in the Verville Air Coach

By LESLIE E. NEVILLE
Technical Editor of AVIATION

WITH SUCH a short period of time having elapsed between the St. Louis and Detroit Aircraft Shows it is difficult to make a comparison between the two groups of airplanes in such a way as to reflect the tendencies in aircraft design. A comparison of the 1930 and 1929 All American Shows at Detroit will probably be much more enlightening. However, we are presenting in Table I a numerical study of the four groups of airplanes exhibited during the past year at Detroit (1929), Cleveland, St. Louis and Detroit (1930).

While probably the most significant development among those seen at Detroit is the Packard Diesel engine, it is difficult to predict at this time just what influence this power plant will have on the design of future airplanes. Only actual service conditions and maintenance problems will serve to show in what way the Diesel engine is to affect the technical development of aircraft. The fact that six of the 75 airplanes at the Detroit Show and several on the field were equipped with the Diesel engine serves to indicate the interest so far evinced by engineers in this significant development. A detailed description of this power plant by Edward P. Warner, editor of AVIATION, was published in the April 5th issue.

Regarding the more conventional engines at the aircraft show, there are several apparent tendencies that are worthy of note. The first of these is the increasing number of inverted-in-line, air cooled types of four and six cylinders and each succeeding exposition seems to bring new power plants in this class to light. Secondly, the developments in gearing and supercharging, as shown by the complete line of American Cirrus Engines, Inc., are of interest. This company displayed not only the vertical American Cirrus but an inverted design of similar characteristics which is available either in normal form, with supercharger, or with gearing. The gearing is of the internal type and provides for normal rotation of the propeller. It is completely built in as part of the engine. It provides a propeller shaft rotation of $\frac{3}{5}$ engine speed. The DePalma supercharger is to be available as a separate unit or as part of the engine in a quickly and easily detachable form. It is of the positive pressure type and is available on both the American Cirrus (vertical) and American Ensign (inverted) types.

The two "L" head engines at St. Louis were absent at Detroit.

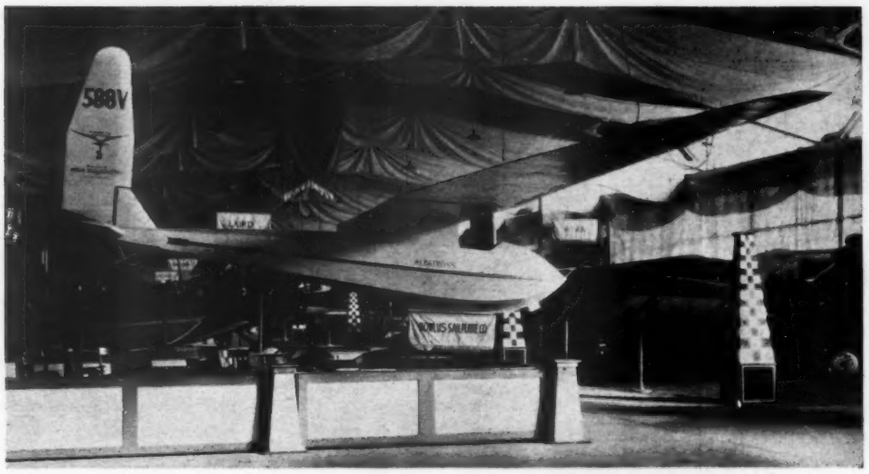
ONE OF the most striking features of the Detroit exhibit was the evidence of the gradual transition from wood to metal. Notable among the examples of this are the Lockheed Vega, which was shown with an all metal fuselage, and the Stinson Airliner, which had a welded steel and aluminum alloy tube wing structure.

While the majority of metal structures employed riveting or welding as a method of fabrication, two of the water craft, the Eastman Flying Boat and the Keystone Loening Commuter, had bolted hull structures.

Although the percentage of amphibions and seaplanes has increased only slightly since the 1929 Detroit Show, it is significant to note that the group of most recent designs among the machines shown this year included a large proportion of the seaplane and amphibion types. The problem of engine location and power distribution in the water craft does not seem to be settled, although most of the newer developments had engines above the wing housed in suitable streamline structures, and the group was about equally divided as regards single or twin engine types.

A substantial increase in the percentage of mono-

Show



The Bowlus Sail Plane, one of the large number of motorless craft exhibited

All-American Exposition and a Comparison With the Past

planes is shown despite the fact that there has been almost an equal increase in the proportion of open machines. The strictly sesquiplane type has dropped in proportion from 4 to 1 per cent during the year.

The single engine craft still lead to the extent of 189 per cent and the new amphibions have aided the twin engine group slightly. For the first time during the expositions under consideration a four-engine airplane, the Fokker F-32, was shown. This, incidentally, attracted considerable interest as the country's largest commercial land plane and, while the machine under consideration was not the standard transport model, it showed an excellent interior arrangement for the club type of plane.

The popular three-place machine seems to be diminishing gradually in point of numbers, as shown by the drop from 29 to 17 per cent during the period elapsing between the two Detroit Shows. Increases, however, are noted in the four-place group and in the airplanes accommodating twelve or more persons.

Regarding power plant types, the radial group have dropped from 90 to 79 per cent and the OX-5 powered group from 9 to 3 per cent. Increases are noted in designs powered with inverted engines and in the group of planes powered by engines above 200 hp. This latter indicates an effort to attain increased performance from greater reserve power and also a possible tendency toward the commercial transport type of craft. Low wing monoplanes have increased from 6 to 9 per cent.

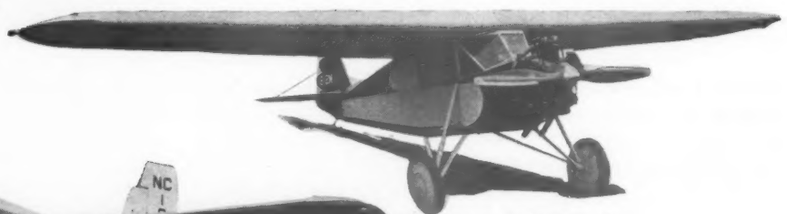
RING TYPE radial engine cowlings, which were conspicuous by their absence at St. Louis, were very much in evidence on a number of airplanes at Detroit. Not only the N.A.C.A. variety, but others of the British Townend ring type, were shown on a large number of airplanes in the exposition building. The new exhaust ring developed by the Pratt & Whitney Co. for its Wasp Junior engine made its appearance on several airplanes, while a modified N.A.C.A. cowling with an exhaust ring built into the front or entrance portion was shown on the new Buhl Airster. Fuselages of circular section designed to conform with N.A.C.A. cowling requirements were observed in large numbers, some being of the monocoque or skin stressed type which seems to be growing in popularity, while others

Table I	Detroit Show 1929		Cleveland Show		St. Louis Show		Detroit Show 1930	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
Total planes entered	100	..	56	..	84	..	75	..
Monoplanes	48	48	33	59	44	52	45	60
Biplanes	47	47	21	37.5	37	44	29	39
Convertible	1	1	0	0	0	0	0	0
Sesquiplanes	4	4	2	3.5	3	4	1	1
Open planes	53	53	31	55	41	49	47	63
Closed planes	47	47	25	45	43	51	28	37
Land planes	95	95	51	91	75	89	68	91
Seaplanes, flying boats	3	3	3	5	5	6	3	4
Amphibions	2	2	2	3.5	4	5	4	5
Single engined	95	95	49	87	79	94	67	89
Twin engined	1	1	2	3.5	2	2	2	3
Three engined	4	4	5	9	3	4	5	7
Four engined	0	0	0	0	0	0	1	1
One place	4	4	4	7	6	7	2	3
Two place	32	32	19	34	23	27	28	37
Three place	29	29	13	23	24	28	13	17
Four place	11	11	5	9	12	14	12	16
Five place	5	5	2	3.5	2	2	0	0
Six place	9	9	8	14	7	8	9	12
Seven place	2	2	0	0	3	4	0	0
Eight place	5	5	1	2	3	4	6	8
Twelve or more	3	3	3	5	4	5	5	7
Radial engined planes	90	90	51	91	72	86	59	79
Vertical in line air cooled	10	10	5	1	5	6	5	7
Opposed	..	..	..	..	1	1	1	1
Inverted in line air cooled	..	..	..	..	1	1	2	3
Water cooled (other than OX-5)	..	..	..	..	2	2	0	0
Diesel	..	..	..	..	..	..	6	8
OX-5	9	9	0	0	3	4	2	3
O-50 hp	3	3	1	2	3	4	2	3
50–150 hp	50	50	22	40	27	32	26	35
150–200 hp	14	14	11	20	17	20	4	5
200–300 hp	11	11	11	20	18	21	15	20
More than 300 hp	27	27	11	20	16	19	28	37
Low wing	6	6	6	11	4	5	7	9
Center wing	3	3	2	3.5	0	0	0	0
Folding wing	7	7	4	7	2	2	1	1

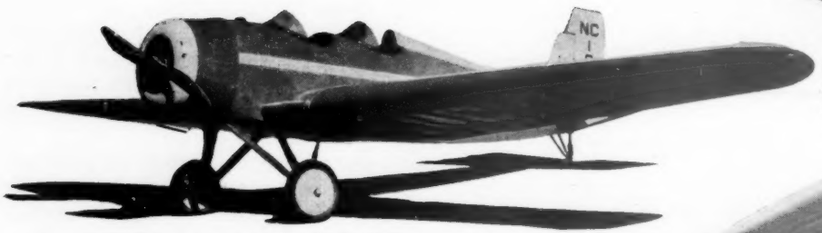
The Lycoming powered Stinson Airliner.

The Buhl Airster powered with a Wright Whirlwind Nine engine.

The Warner powered Waco Model F.



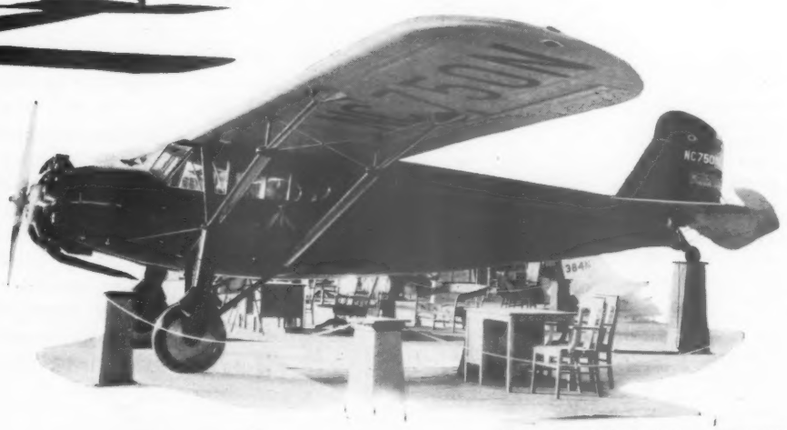
The most recently designed Monocoupe powered with a Lambert engine.



The Watkins low wing monoplane powered with a LeBlond engine.

New Planes

AT DETROIT



Wright Whirlwind powered Spartan four-place monoplane.

Diesel engine installation in the TA-3 flying boat displayed by Towle Aircraft.

were of more conventional rectangular section, employing fairing to produce the circular exterior section.

The Fokker F-32 embodies tandem air cooled engine installation and it is understood that this type of power distribution is being tried for the F-11 amphibion, also built by the Fokker Co. The F-11 exhibited at the Detroit Show, however, was a single engine pusher.

Metal propellers, hydraulic shock absorbers, tail wheels and brakes predominated in the point of numbers and one airplane was displayed with a Micarta propeller. A considerable increase in the use of low pressure tires was noted and in a number of cases they were used without provision for additional deflection.

One of the features of the exposition that could not fail to attract the eye was the unusual and somewhat vivid color combinations employed on many of the airplanes, notably those of the Fokker Co. Multi-colored propeller blade tips, partly for decoration and partly for protection also seemed to be the order of the day. Interior finishes also have been constantly improved, seemingly in an effort to equal present closed automobile practice.

Another feature of the show that could not possibly be omitted was the prevalence of gliders in the company's exhibits. Many of the leading manufacturers of sport planes are offering engineless craft of various sorts. Notable among the glider exhibits was the record breaking Bowlus Sail Plane and in addition to the commercial products in this class there were several apparently locally constructed engineless machines. It seems evident that a large glider market is anticipated by many of the airplane manufacturers.

Table II.—New Planes and Engines Introduced at the Detroit Show

(Not previously described in AVIATION)

AIRPLANES

Manufacturer	Designation	Type	Engine	Span	Gross Wt.
Buhl	Airster	OML	Wr	30′	3,000
Consolidated	Fleetster	CML	Pww	45′	5,300
Crosley	Moonbeam	OBL	Cr	29′	1,622
Fokker	F-11	CMA	Pwh	59′	7,200
Fokker	F-14	OML	Pwh	59′	7,200
Granville	Gee Bee	OBL	K	29′	1650
Issoudun	.....	CMA	War (2)	44′	3,550
Ogden	Osprey	CML	Cir (3)	50′	4,500
Sikorsky	S-39	CMA	Pww	52′	3,700
Simplex	Kite	OML	Dwn	39′	975
Spartan	.....	CML	Wr	50′	3,515
Stinson	Airliner	CML	3Ly	60′	8,400
Towle	TA-3	CMF	D (2)	57′	5,500
Waco	Model F	OBL	K, War	30′	1,900
Watkins	Skylark	OML	Lb	37′	1,475

ENGINES

Manufacturer	Designation	Type	Rated Hp.	R.P.M.	Weight
Chevrolair	D-6	IL	170–195	2,000	425
Cirrus	Am. Ensign 4	IL	95	2,100	273
Cirrus	Am. Ensign 6	IL	150–170	2,100	...
Cirrus	Geared En.	IL	95	2,100	305
Cirrus	Super En.	IL	110	2,100	326
Cirrus	Geared and Super En.	IL	110	2,100	359

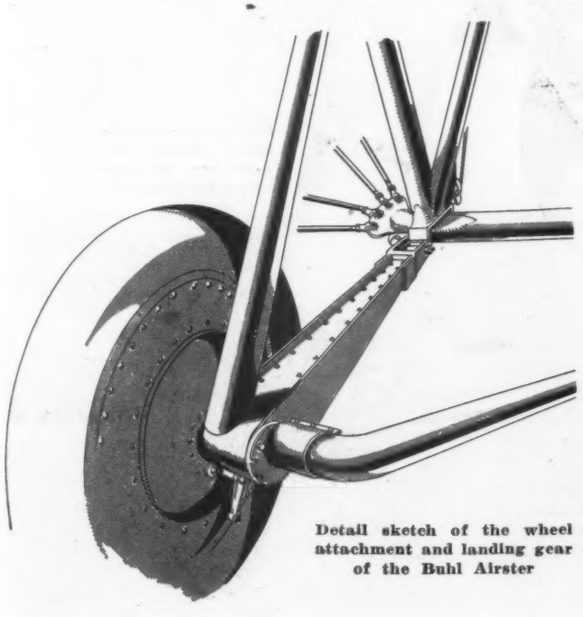
A —Amphibian
B —Biplane
C —Closed
L —Landplane
M —Monoplane
O —Open
Lb —LeBlond
Ly —Lycoming
Cir—Cirrus
K —Kinner
War—Warner
Wr —Wright
IL —Inverted-in-line
D —Packard Diesel

IN DISCUSSING the characteristics of the various new designs exhibited at Detroit, space limitation prevents the possibility of going into greater detail at this time. Many of the new airplanes, however, will be treated individually in early issues of AVIATION. Brief specifications are given in Table II.

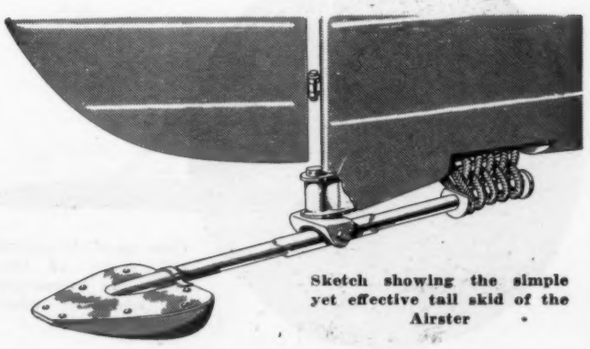
Among the recently designed new airplanes introduced at Detroit were the Buhl Airster and Watkins Skylark, both members of the low wing monoplane classification. The Buhl plane, which is designed primarily for mail work, is powered with a Wright Whirlwind Nine engine and, although it has not been completely test flown, it gives evidence of possibilities of high performance characteristics. The wing is of conventional construction, while the fuselage is built up of the usual welded steel tubing with aluminum alloy fairing to produce circular section in an effort to conform with the lines necessitated by the use of a N.A.C.A. type of cowling. Streamline wires are used in the external wing bracing.

The Watkins Skylark follows standard construction and is powered with a LeBlond 60 engine. A N.A.C.A. type of cowling is used as standard equipment.

Consolidated Aircraft Corp. gave its first public showing of the Fleetster at Detroit. This plane is an eight-place, high speed transport monoplane powered with a 575 hp. Pratt & Whitney Hornet. The fuselage is of all metal monocoque type construction reinforced by special heat treated extruded dural sections. The

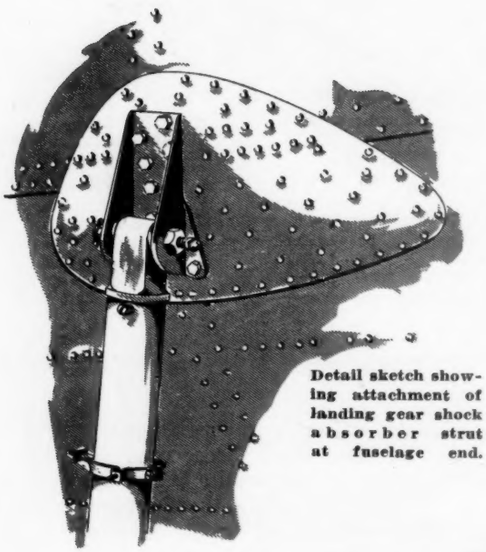


Detail sketch of the wheel attachment and landing gear of the Buhl Airster

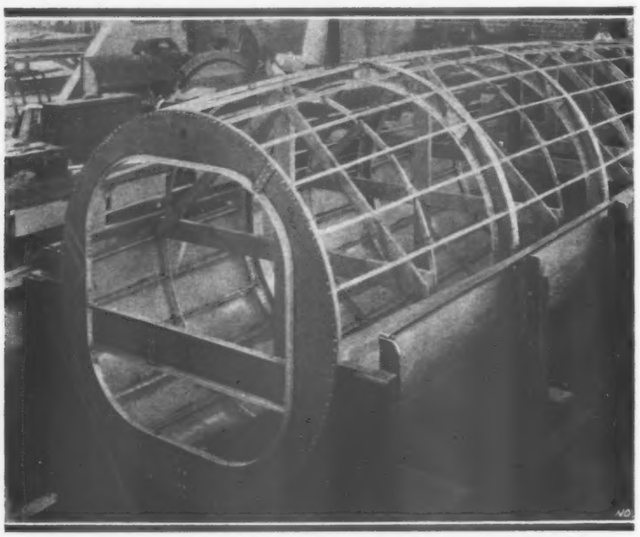


Sketch showing the simple yet effective tail skid of the Airster

THE CONSOLIDATED "*Fleetster*"

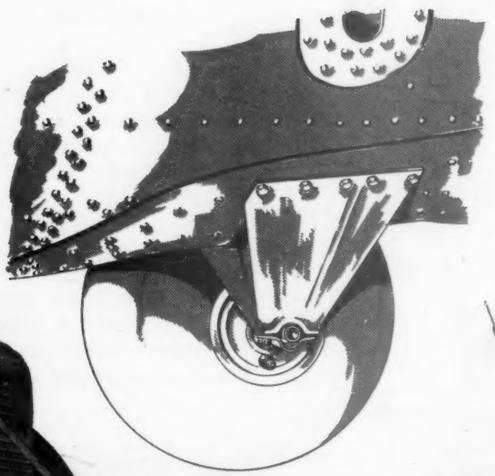


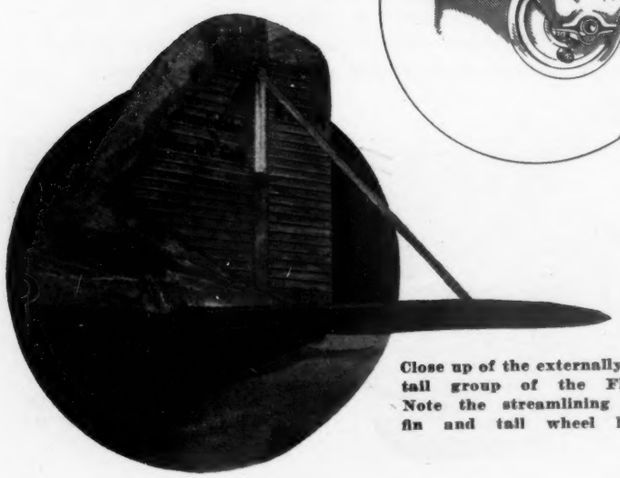
Detail sketch showing attachment of landing gear shock absorber strut at fuselage end.



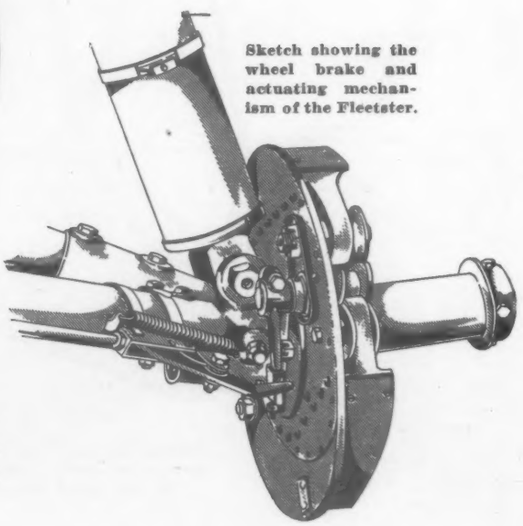
The partially covered fuselage structure showing the construction details of the fire wall.

Detail sketch showing attachment of the tail wheel mounting member.



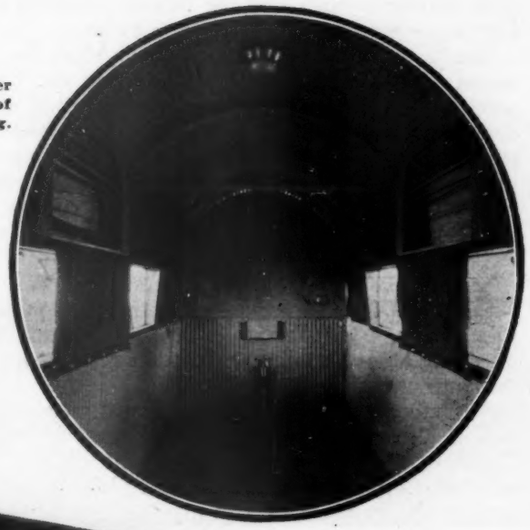


Close up of the externally braced tail group of the Fleetster. Note the streamlining of the fin and tail wheel housing.

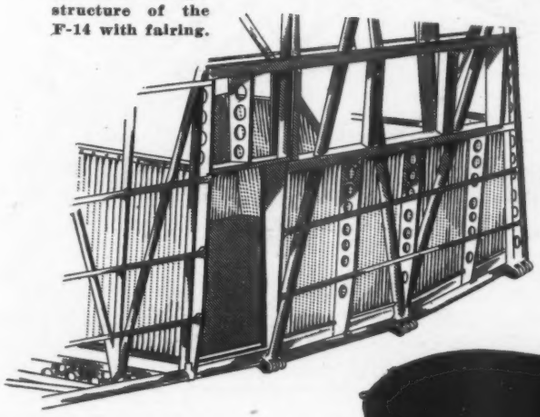


Sketch showing the wheel brake and actuating mechanism of the Fleetster.

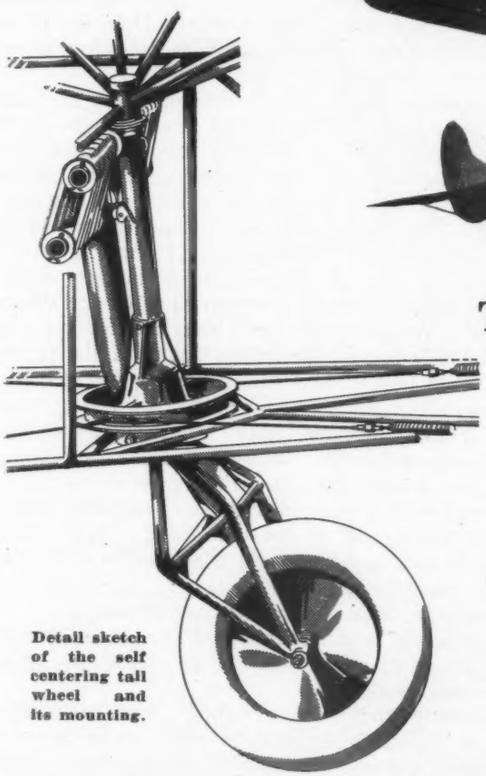
Photograph of the mail or passenger compartment. Note the method of covering control rods and wiring.



The fuselage structure of the F-14 with fairing.

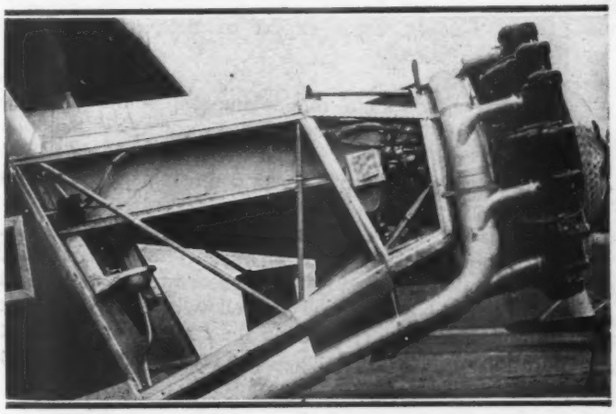


THE FOKKER *F-14*



Detail sketch of the self centering tail wheel and its mounting.

Sketch of the forward portion of the fuselage showing exhaust heater installation.



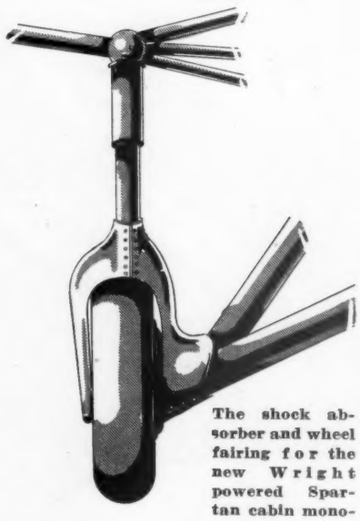
Installation of the lavatory compartment between the cabin and fire wall.

rivet spacing is such that the fuselage itself is reasonably water tight as an emergency measure.

Similar construction is again employed in the engine mount. This mount is conical in shape and complete access to the rear of the engine may be had through doors in the fire wall. A Goodyear air wheel rigidly mounted serves as a tail wheel. The wing is of internally braced wood and plywood covered construction. All tail surfaces are of metal construction.

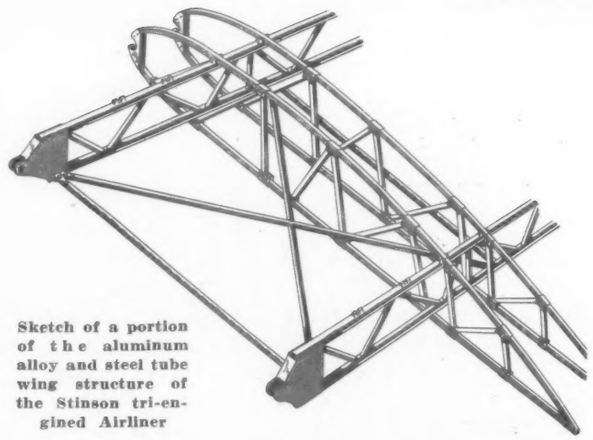
An interesting addition to the two place tandem biplane group was the Crosley Moonbeam two-place training biplane powered with a four-cylinder inverted "Crosley 300" engine, which develops 100 hp. at 2,100 r.p.m. The plane had a welded unit Cabane and an internally braced stabilizer. In other respects it follows the conventional type of construction.

The aforementioned tendency toward metal construction is also reflected in the introduction of the metal Lockheed Vega model in the exhibit of the Detroit Aircraft Corp. This plane is almost identical in appearance to the standard wooden machine and has approximately the same weight empty. The wing and tail surface construction, as well as the general outline of the plane, are standard Lockheed Vega units, while the fuselage alone has been changed from wood to metal. The metal construction of the fuselage has been simplified so that the skin can be applied lengthwise in long formed sheets and riveted to the diaphragms. T-section aluminum alloy members are employed at the seams and provide both longitudinal stiffness and finish to the exterior, since the skin sheets are riveted to the lower side of the cross member of the T-section, leaving the cross member on the outside of the structure to form a finishing bead. The skin is .028 aluminum alloy sheet. Use of metal may be extended to wing and tail surface construction at some future date. Other features of the Detroit Aircraft display were Diesel powered planes, including the Eastman flying boat and the Ryan Foursome, as well as the new Ryan Speedster which appears to be a de luxe edition of the Parks P-II three-place open cockpit biplane.



The shock absorber and wheel fairing for the new Wright powered Spartan cabin monoplane

For the first time in its history the Fokker Aircraft Corp. division of General Motor Co. displayed its entire line of aircraft. In addition to the F-32, which is the most recent member of the group, a de luxe model of the familiar F-10 tri-motor, the Hornet powered F-11 amphibion, the F-14 mail and passenger plane and the Universal and Super Universal constituted the display. Probably the outstanding feature was the specially designed F-32 which has been built as a flying office and home for L. P. Fisher. This craft contains living room, smoking room, sleeping compartment with full size berths for four, a fully equipped office and a galley having cooking and refrigeration facilities. It is designed to carry fifteen passengers by day or for a fully equipped home for four people. The latest type of two way radio telephone set designed by Western Electric in cooperation with Herbert Hoover, Jr. of Western Air Express is installed to provide communication with the ground.



Sketch of a portion of the aluminum alloy and steel tube wing structure of the Stinson tri-engined Airliner

The technical details of the Fokker F-32, the Universal, Super Universal and F-10 have been presented in detail at various times in AVIATION magazine. The F-11 amphibion has also been mentioned in the January 5th, 1929 issue. It is interesting to note that the metal hull of this craft is built at the Holland factory of the Fokker Company and the wing is an American product bearing all of the characteristics of Fokker design.

Designed to conform to the provisions of the Watres bill, the F-14A mail plane has a standard Fokker wing and is the only one of the group that is of the parasol type. This is necessitated since the pilot sits well back toward the tail of the plane, in contrast with the position in other Fokker models. Mail or passengers or both can be transported in the forward portion of the fuselage.

This plane is powered with a Pratt & Whitney 525 hp. Hornet engine or a Wright Cyclone. The cabin interior is finished throughout in duralumin and is painted and arranged in such a manner that it is readily convertible for mail, baggage or passenger use. A lavatory is located between cabin and engine compartment.

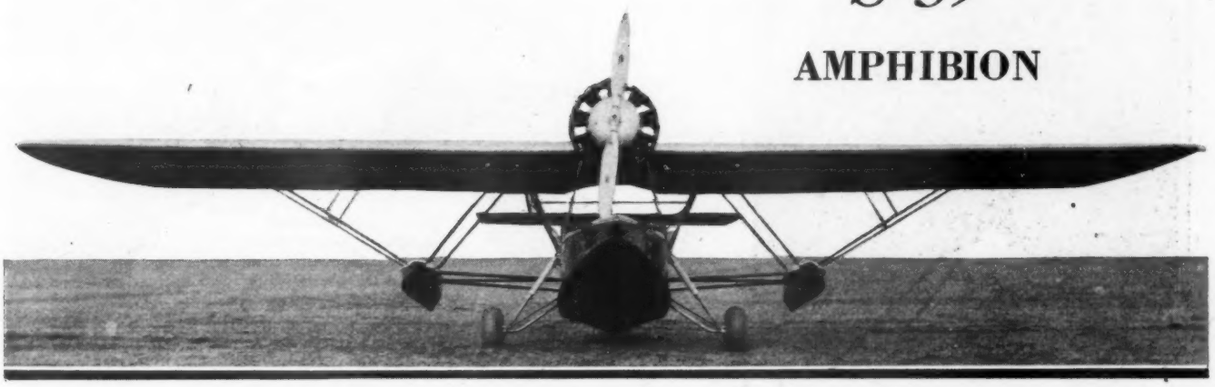
The tail wheel is swivel mounted yet always remains straight when in flight due to an ingenious spring arrangement.

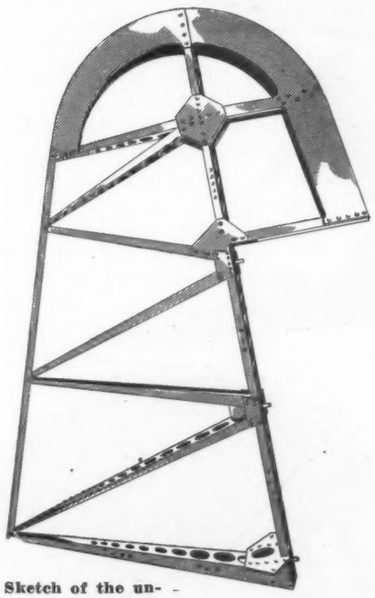
Undoubtedly the Fokker exhibit was outstanding because of the attention paid to color combinations in both exterior and interior finish of the airplanes. Credit for this is due to the long experience of Abraham Lincoln Cooper, color expert of the General Motors Export Division.

A FOUR PLACE metal monoplane amphibion constituted the exhibit of the Issoudun Aircraft Co. This plane is not strictly all metal in that the wings and part of the fuselage rear of the passenger compartment are covered with fabric.

The plane is an externally braced monoplane using an airfoil developed by the company. The covering of the hull is constructed of formed sheet metal, and the hull and center section are covered with "Hyb-lum" an aluminum alloy developed by the Sheet Aluminum Corporation of Jackson, Mich. The craft's retractable land-

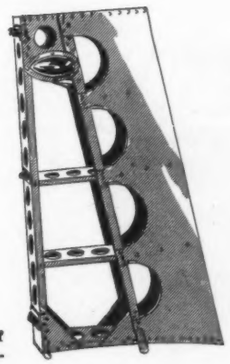
THE SIKORSKY *S-39* AMPHIBION



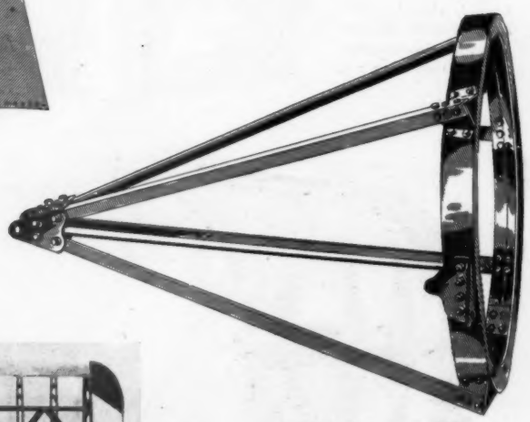


Sketch of the uncovered rudder

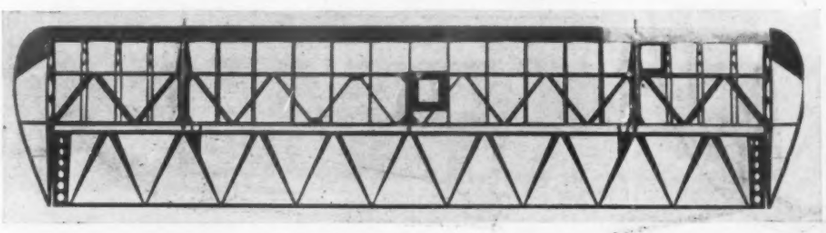
One of the wing floats in inverted position to show bottom



Detail drawing of the stabilizer framework of the S-39

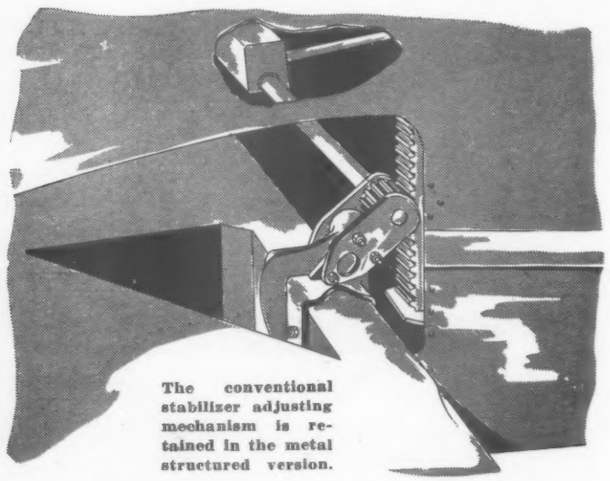


Engine mounting showing framework for fairing



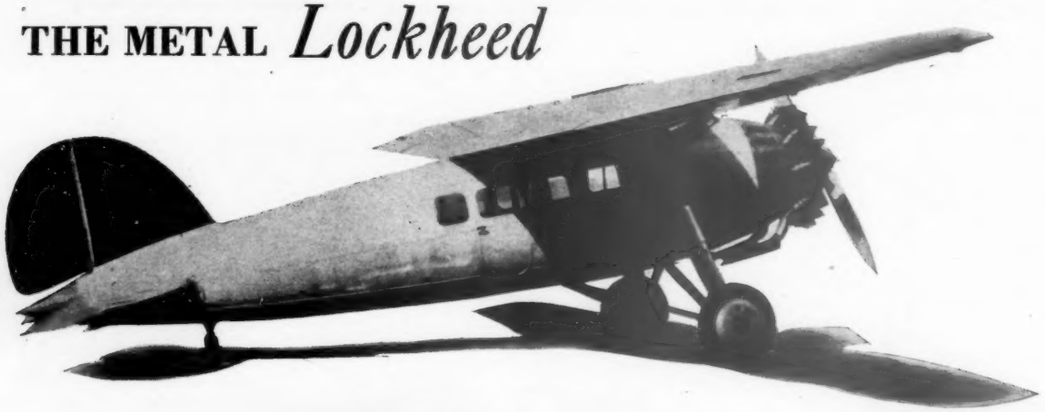
Complete wing framework showing details of construction

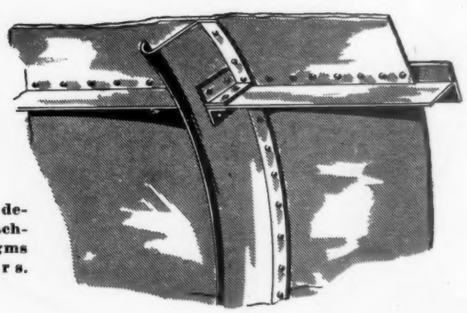
Interior view of seating arrangement.



The conventional stabilizer adjusting mechanism is retained in the metal structured version.

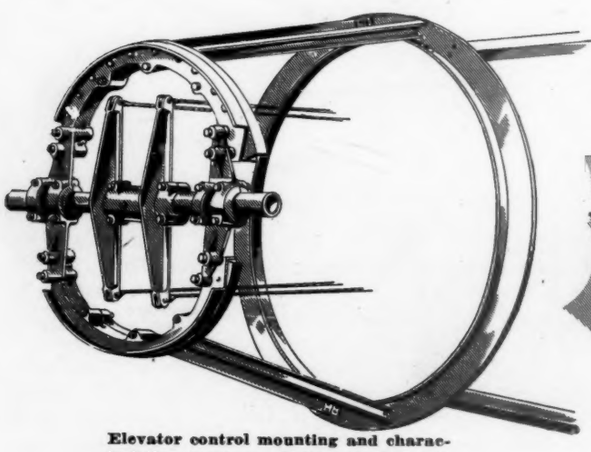
THE METAL *Lockheed*



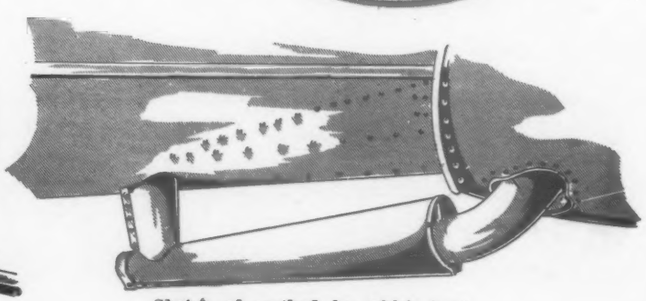


Sketch showing details of skin attachment to diaphragms and stringers.

Interior of metal Vega with table set up.



Elevator control mounting and characteristic structure sketch of the tail.



Sketch of method by which heat from exhaust is carried into cabin.

ing gear is hydraulically controlled by means of a hand pump in the compartment, and when retracted the wheels lie horizontally along the hull. The wheel tread is 8 ft.

Of the two planes shown by E. M. Laird Company of Chicago the most recent is the Speedwing special, a development of the Laird Speedwing model of last year. This year's plane was fitted with the Pratt & Whitney 450 hp. Wasp engine. It was a three place open cockpit biplane with typical Laird lines and has many interesting refinements.

In addition to this plane, two of the Laird standard models were exhibited.

REPRESENTING the medium weight, three engined group, the "Osprey," exhibited by the Ogden Aeronautical Corporation of Inglewood, Calif., attracted attention. The Osprey is a six place, cabin monoplane following conventional construction practice. It was an exceedingly well finished machine.

It is interesting to note that one company whose production had been devoted to open biplanes introduced a closed monoplane at the show. This machine, a Whirlwind Seven, four place, cabin monoplane which was rushed to completion for the exhibit by the Spartan Aircraft Co., is for the most part of conventional design with the possible exception of the landing gear. The upper end of the vertical shock strut is attached to the lift struts, while the lower end terminates in a forked wheel mounting. The entire unit is inclosed in streamline fairing. This results in an unusually clean landing gear. The wing design is noteworthy for its relatively high aspect ratio. It is well finished, both internally and externally.

Bearing a striking resemblance to its predecessors the Sikorsky S-39, four place cabin monoplane amphibion was introduced at the show. Their S-39, is powered with a Pratt & Whitney Wasp Junior.

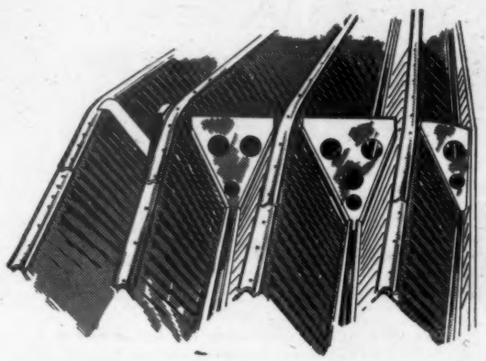
The S-39 has an all metal hull consisting of metal framework covered with Alclad sheets. The streamlining and the V bottom of the hull follow conventional Sikorsky practice. The new plane has a wing of metal and fabric construction. The diminutive lower wing of the S-38 has been replaced by a system of horizontal "H" struts in the S-39.

The hydraulic retracting system for the landing gear operates the wheels either separately or simultaneously.

Although not displayed in the exposition building the new Corman Airliner introduced by Stinson was of interest. The plane is powered with three Lycoming radial engines, model R-690. These engines are rated 210 hp. at 2,000 r.p.m. Electric and hand inertia starters are standard equipment.

The primary structure including the wing of the "Airliner" is of metal, while the plane is completely fabric-covered. Metal cowling is used on the nacelles and the center engine compartment back to and under the pilot's compartment. The fuselage is completely welded of chrome-molybdenum steel tubing.

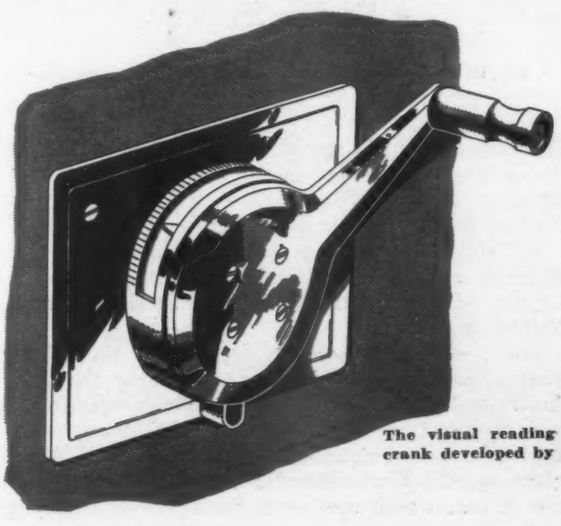
Spars of the Airliner are of steel tubing construction. Compression members are of truss construction built of steel tubing. The ribs are of square duralumin tubing held together by dural gusset plates and rivets. The



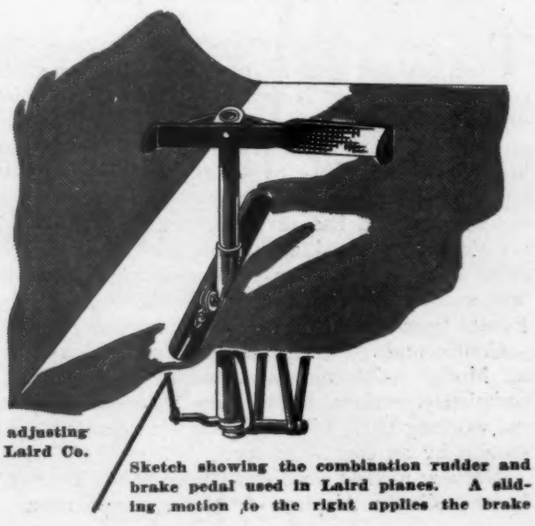
The internal trussing of the Towle Amphibion wing before completion. Note method of carrying webbing between the stringers

leading edge of the wing is a dural tube which serves as a conduit for the electrical wiring. Dural fairing covers the leading edge back to the front spar. All control surfaces are of steel tube fabric covered construction.

A club plane similar in appointments to the one exhibited in St. Louis but far more attractively finished, particularly on the exterior, was shown by the Stout Airplane Division of the Ford Motor Co. The metal exterior was beautifully burnished and the propeller



The visual reading stabilizer adjusting crank developed by the E. M. Laird Co.

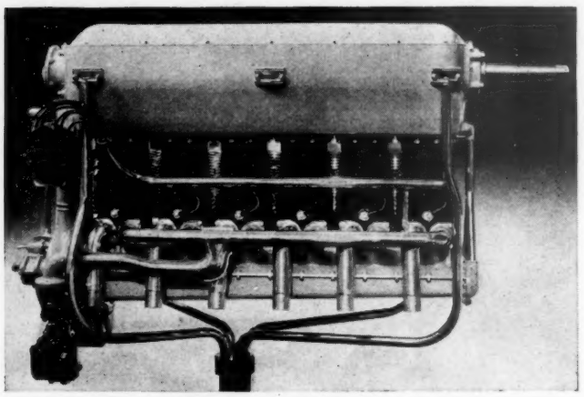


Sketch showing the combination rudder and brake pedal used in Laird planes. A sliding motion to the right applies the brake

blade tips were finished with red, white and blue colors.

The Towle flying boat, Model TA-3, was completed just before the show. This plane was of 8 place capacity, and powered by two Packard Diesel engines placed above the wing. It is soon to be available as an amphibion.

This machine is built entirely of metal and careful workmanship is one of its characteristics. It is also noteworthy for its unique wing structure. In principle, the internal trussing of the Towle wing may be called an elongated rib section extending from root to tip. Instead of being composed of a number of small ribs assembled into a unit and spaced several inches apart,



Side view of the 6-cylinder 150 hp. Model D-6 Chevolair inverted engine

this wing has a single corrugated sheet, zigzagging through the section fore to aft, and attached to the skin at the bend. That corrugated portion of the zigzag sheet between the bend acts as the beam webbing of ordinary ribs.

Two wing stringers of male and female section, extending along each bend, and between which a flattened portion of the corrugated sheeting passes, act as spar flanges. The combination of webbing and stringers is designed to take the place of spars and ribs.

Waco exhibited a new Model F biplane which they will add to their line of commercial planes. The Model F is a three place open cockpit biplane, smaller all around than other Waco Models. The buyer is given a choice of either a Kinner or a Warner Engine.

THE OUTSTANDING FEATURE of Chevolair Motors, Inc., exhibit was its new six-in-line, inverted, air cooled engine which is similar to the company's four-in-line engine. The D-6 develops its maximum hp., 190, at 2400 r.p.m. and delivers 170 hp. at 2,000 r.p.m. It has a bore and stroke of $4\frac{5}{8}$ in. and $5\frac{1}{4}$ in. respectively and a displacement of 529 cu.in. The crankshaft is 3 in. in diameter and has seven bearings. All oil passages are drilled or cored and a valve allows for a change from dry to wet sump system should an oil line be broken. Ignition and carburation are furnished by dual Robert Bosch magnetos and dual Stromberg carburetors.

Continental Aircraft Engine Co. exhibited two of its Model A-70 engines. One of these engines was completely sectionalized to show all operating parts and the working parts of the engine were constantly kept in motion by an electric motor.

No new models were introduced at the Detroit Show by the Kinner Airplane & Motor Corporation. They had on display their standard K-5 100-hp. engine, and also one of their R-715 190-hp. type, the latter having been introduced at St. Louis. Lycoming displayed its usual show exhibit model.

A two-stroke cycle, two-cylinder opposed engine was exhibited by Cleone Motors and its use in connection with gliders suggested by the manufacturer. The engine is of the two-port type and rated at 25 hp. at 2,700 r.p.m. The weight with propeller is 52 lb. An engine of somewhat lower power is also included in the production planes of the manufacturer.

The latest improved models of the 66 and 99 engines were shown in the LeBlond booth. The most recent model has been conservatively rated 85 hp. at 2,125 r.p.m.

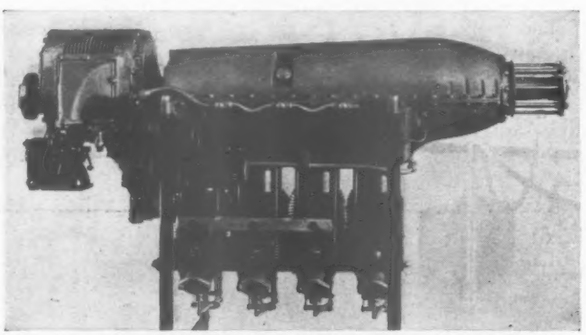
Pratt & Whitney Aircraft Co. exhibited their full line of air cooled aircraft engines at Detroit. Their exhibit was sponsored by the Stout Airlines Inc., their authorized dealers in Detroit and Cleveland. As at St. Louis, the feature of the exhibit was a 300 hp. Wasp Junior with the new manifold and cowling.

Warner Aircraft Co. had on exhibit their standard five- and seven-cylinder radial engines. The latest of these was the five cylinder Scarab Junior, introduced in St. Louis and described at the time in AVIATION.

THE AC SPARK PLUG COMPANY of Flint, Mich. exhibited a complete line of Miko spark plugs graded according to heat range.

Two new instruments shown by the Pioneer Instrument Company division of Bendix Aviation Inc., were a fuel flow meter and a fuel level gage. In addition, all of its other instruments with minor improvements added in many cases, were shown.

Berry Brothers displayed a complete color salon. This consisted of fifteen oil paintings of airplanes, showing them finished in attractive color schemes. In addition a large number of model planes were finished in attractive colors and designs. A living parrot of particularly bright plumage was a feature of the display.



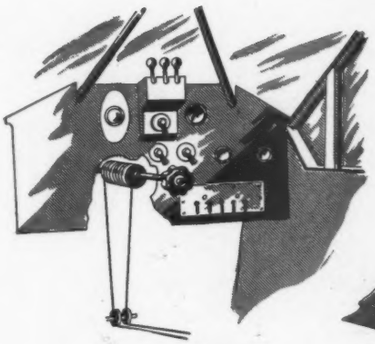
The Hi-Drive Ensign engine with DePalma supercharger as shown by American Cirrus Engines, Inc.

A display of alloy steels and special heat-treated steels of airplane quality were exhibited in Booth No. 14, on Ingalls Airway by the Bethlehem Steel Company of Bethlehem, Pa.

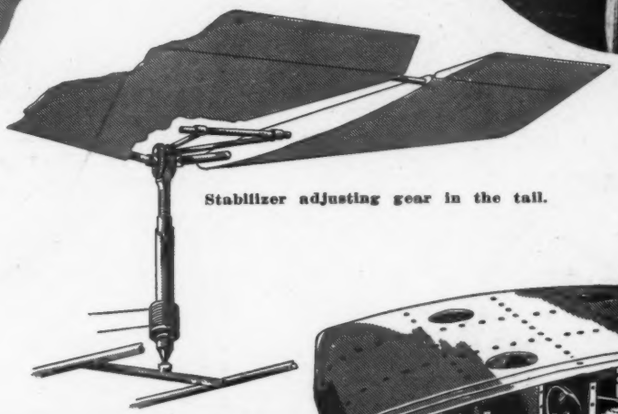
Edo Aircraft Corporation depicted its line of floats with a complete set of pictures showing the line of American built airplanes equipped with them. In addition, they had one of their Model 5300 floats, which is used as standard equipment on the Lockheed Air Express and the Consolidated Fleetster. A cutaway section of one of their new series floats was on display, giv-

THE OGDEN "*Osprey*"

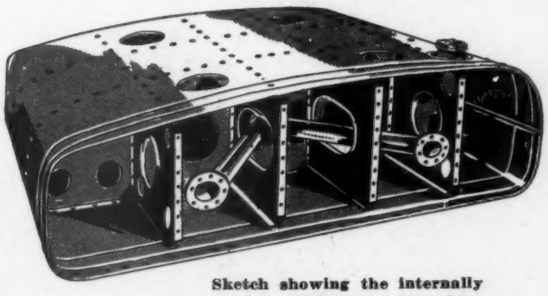
Cabin interior of the Osprey looking toward the rear.



The unusual type of stabilizer adjustment control on the instrument board.

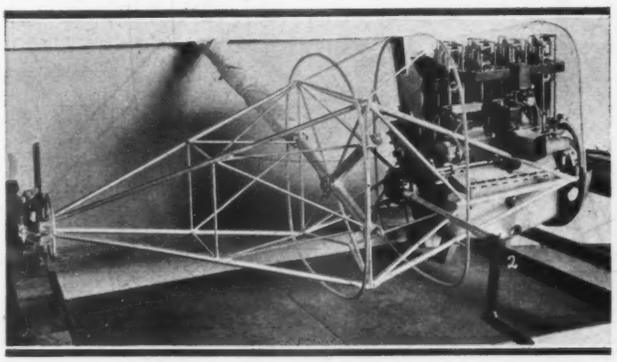


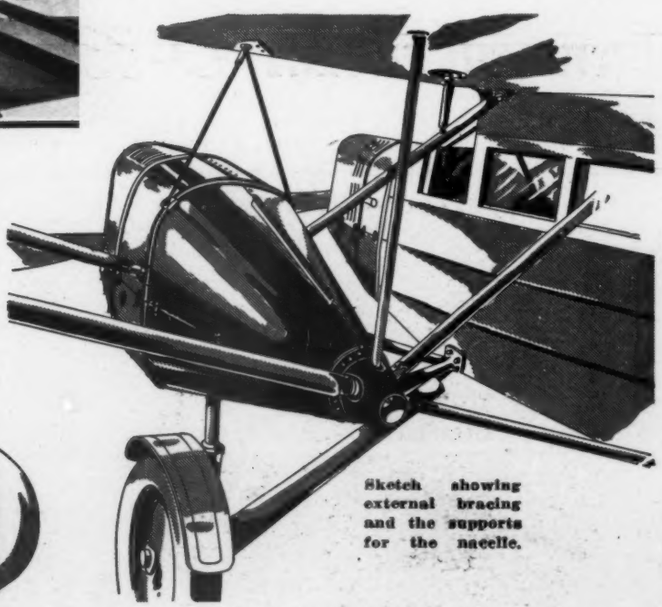
Stabilizer adjusting gear in the tail.



Sketch showing the internally braced gasoline tank which is built up of terne plate.

Photograph of the structure of one of the engine nacelles.



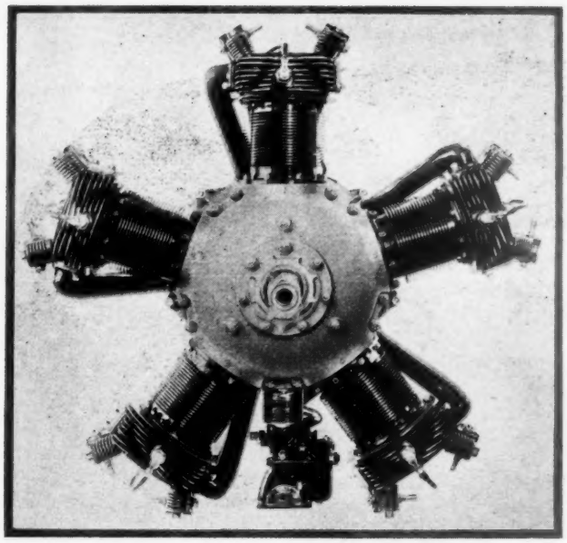


Sketch showing external bracing and the supports for the nacelle.

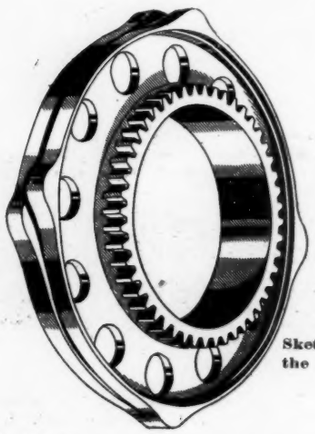
Tail wheel construction sketch showing centering mechanism and shock absorber unit.

TACOMA PUBLIC LIBRARY

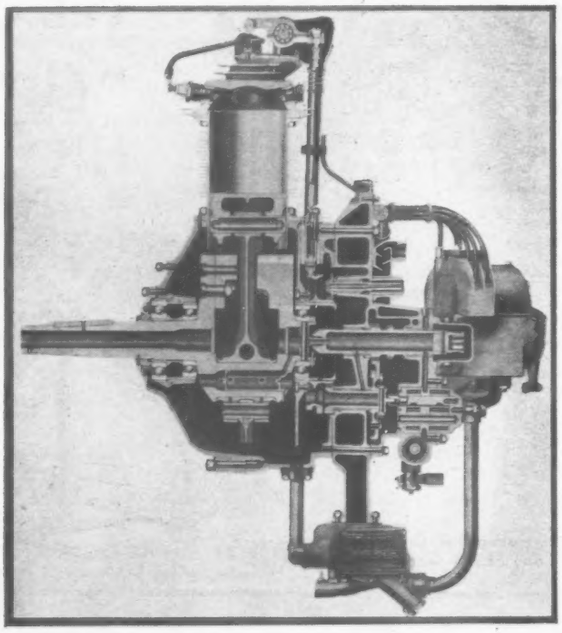
THE WARNER *"Scarab Junior"*



Front view of the Warner Scarab Junior engine.



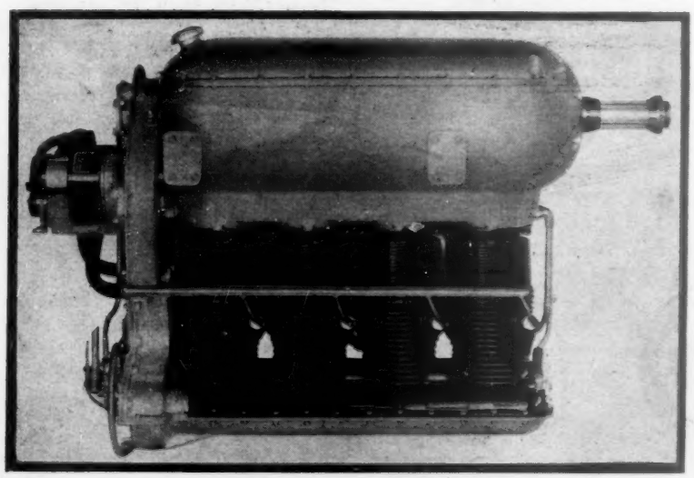
Sketch showing the cam ring.

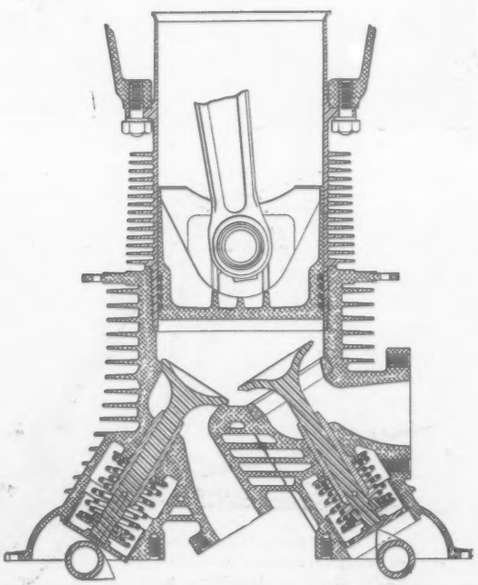


A phantom interior view of the Scarab Junior.

THE CHEVROLET *D-333*

Profile view of the Chevrolet D-333 showing general arrangement of accessories.





Sectional view of Chevrolet cylinder showing general arrangement of camshafts and valve action. This was a prominent feature of the Detroit display.

ing a clear view of the die stamped bulkhead and fittings, and the other interesting details of construction.

The Elgin National Watch Company, Instrument Division, exhibited a complete display of all the aircraft instruments of its manufacture. Notable among them were the Elgin Avigo compass, the airspeed indicator, the altimeter, Elgin Avigo clock and the ball bank indicator, together with an A N standard size chronometric tachometer.

The General Electric display was much the same as that at St. Louis with one exception. This was the standard 1,500 watt Department of Commerce radio range beacon transmitter. This beacon is an aural type.

Representation of a complete line of small tool equipment for automotive and aircraft maintenance work was in evidence in the display of the Greenfield Tap & Die Corporation. A feature of the exhibit was the No. 3438 spiral expansion reamer with a specially designed aircraft pilot.

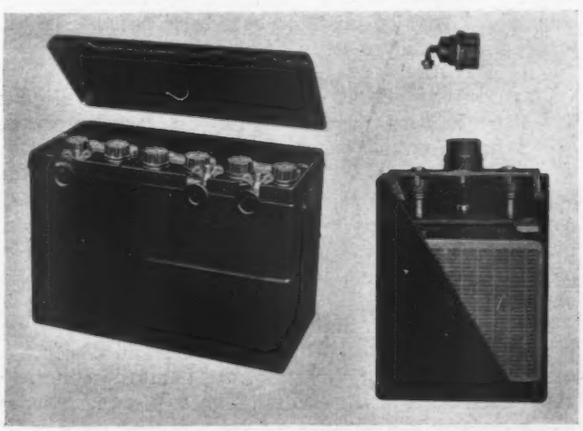
Two new propeller models were introduced by the Hamilton Standard Propeller Corp. and designated Sport Junior and Sport Senior. The Junior is designed for engines at 60 to 90 hp. and has diameters from 5 ft. 8 in. to 7 ft. and a weight range of 25 to 27 lb., while the Senior is intended for engines of 90 to 115 hp., diameters of 7 ft. to 8 ft. 4 in. and weight range from 35 to 37 lb. A new wood propeller of conventional design was introduced by the Kari-Keen Propeller Co. of Sioux City, Iowa.

The Haskelite exhibit consisted of samples of Haskelite and plymetl, used in aircraft fuselage, leading edges, engine flooring, walk ways, wing rims, wing beams, seats and other places where they are adaptable.

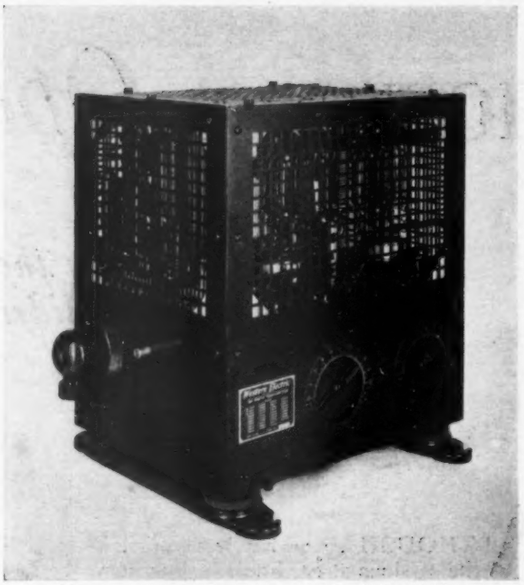
The Imperial Brass Manufacturing Co. displayed much the same equipment as at the St. Louis Show. One exception was a new cabin toilette which they have installed on the new Ford plane.

INTERNATIONAL NICKEL Co. of New York exhibited various castings and machine parts made by Standard Engine and Accessories Companies throughout the nation, using nickel steel and nickel cast iron. The Skelly Oil Company had a model of a Spartan biplane at the Exhibition which attracted much attention. Using an electric refrigerator to simulate atmospheric conditions they also gave a demonstration of their oil flowing at temperatures below zero.

Included among the material exhibits were a group of Nitralloy standard bushings, tools and precision parts.



Photographs of the radio shielded special Willard aircraft battery



The 8-A crystal control 50-watt radio transmitter for short wave work shown by Western Electric Co.

An instructive exhibit showing the uses of magnesium alloy, was sponsored by the Dow Chemical Co.

The center of attraction of the Stromberg booth was a complete carburetor service tool kit. This kit is intended for the use of both airway operators and those servicing Stromberg carburetors. The equipment comes complete in a special metal box handy for shop use.

A model draw-bench complete in every detail and actually drawing tubes was the exhibit of the Summerill Tubing Company. In addition the booth contained a Radiac cut-off machine which was demonstrated throughout the show.

The United States Rubber Company showed a complete line of new low-pressure aeroplane tires. These tires are of standard construction, but designed to give the plane the advantage of reduced inflation and increased ground contact. The tires are designed to operate at a 20-lb. inflation pressure.

The display of the Westinghouse Electric & Manufacturing Co. centered largely around Micarta and its applications. In addition, it included a complete line of wind and motor-driven generators, aircraft floodlights, and Hollow-Spun concrete standards. Notable in the display was the new neon marker for transmission towers. This marker consists of six Neon tubes of rugged construction. The tubes are connected in series, and each is protected by an automatic cut-out in such a manner that the marker remains in service as long as one tube remains active.

The Willard Storage Battery Company displayed a new type of aircraft battery. This battery was an outgrowth of their SAE No. 36 Battery, which has been used on many planes equipped with landing lights. The Standard SAE No. 36 Battery was originally designed for military service so as not to show any leakage in an upside down position. The new battery has been designed not to show any leakage in a 90-deg. position, and it will not spill when turned upside down. This is quite sufficient for ordinary commercial work and results in a saving of approximately 10 lb. in weight, as contrasted with the No. 36 battery. Complete radio shielding is provided.

HOW THE *Operators* LOOK AT

Discussed by the S.A.E. at Detroit, along with Superchargers, Gliders, Diesel Engines, and other matters

By EDWARD P. WARNER
Editor of AVIATION

ALTHOUGH somewhat less varied in scope than the sessions at St. Louis in February, the Detroit meeting of the S.A.E., held on Tuesday and Wednesday of the show week, drew a very satisfactory attendance. There were several general engineering papers and descriptions of outstanding new devices, such as the Packard-Diesel engine and the Curtiss Tanager, and also a very comprehensive account of the derelictions of the aeronautical engineer and engine designer as viewed by the operator. Mr. E. P. Lott, manager of operations of National Air Transport, and Mr. Wesley L. Smith, superintendent of the Eastern Division of the same company, collaborated on "Airplane and Engine Requirements from an Operator's Viewpoint."

As operators of both monoplanes and biplanes, including a certain number of multi-engined machines, and of both air-cooled and water-cooled engines, officials of N.A.T. were peculiarly well-placed to offer criticism.

Emphasizing a lack of proper mutual understanding between manufacturer and operator as a fundamental cause of difficulty with flying equipment, the authors repudiated any suggestion that it was up to them as operators to lay out a complete prescription for the design. They preferred to leave that responsibility with the designer and to make their own role a helpful and critical one, but they "believe that it is vitally necessary for the designer to spend a short while in the field in personal contact with the day-to-day operations, including the overhaul and major repair departments, to gain an insight into the problems that no amount of correspondence and conference could serve to give him."

The paper treated of a great variety of subjects and paused only momentarily on each one. The most general criticisms applied to failure to supply full operating equipment with the plane.

Cowling gives trouble both because of cracking from vibration and because of difficulty of removal to get at any interior parts. There must be protection against friction and against relative movements between the various cowl fastenings. Shock-absorbing units should, judged by the authors' experience, be used on motor mounts to damp out vibration. The space between the rear of the engine and the fire wall, for which neither the engine nor the airplane designer assumes full responsibility, is found often to be a wilderness of pipes and wires tangled up with each other. Fuel systems fail by breakage and fail by vapor lock. They are prone to contain too many hose connections. After much redesigning, National Air Transport has developed a fuel generally satisfactory for their use. The pressure release valve is still a source of occasional trouble, but has been much improved in consistency of performance by a change from a ball valve to a poppet type.

E. P. Lott

Advertised engine fuel consumptions are based on dynamometer trials and are commonly, said Mr. Lott, distinctly superior to the results obtained in practice. The pilot cannot run the engine for the extreme of economy without danger of getting the mixture too lean and burning valves. On radial engines there is particular danger of starving one or more cylinders because of imperfect distribution.

The paper contained a high tribute to the magneto, attested to be the most reliable of aircraft accessories. The general electric system of the planes now being confusingly complicated, the authors urged that light rigid conduit for wire be provided as a basic part of the airplane, as is already done in Stearman mail planes.

AIRPLANE STRUCTURE was criticised not for inadequate strength, but for propensity to wear. It was especially urged that removable bushings should be used in all cases where there is relative motion between parts, and that ball and roller bearings should be much more extensively employed, particularly in the control systems, which were reported at present "to literally shake themselves to pieces." Anti-friction bearings were also highly commended for wheels.

Mr. Lott and Mr. Smith, both as veteran pilots themselves and as responsible for the safety and comfort of the pilots in their organization, are naturally concerned about conditions in the cockpit. They strongly objected to the present complication of controls and instruments there, and recommended that the cockpit should have a

AIRCRAFT

rigid lining with the wooden parts of all controls hidden behind the cockpit walls and only the actual operating levers coming through.

Operators want to be able to drain all strainers in the fuel line while the plane is in flight, and also to have some means of keeping out of the carburetor jets, or else passing through the jets without clogging, the drops of water which condense out of the air on the inside of the carburetor bowl. Improved means of heating the air are sought, and so is a greater mechanical solidity in the carburetors to insure against their collapse by vibration. Mr. Lott made favorable comment on the down-draft carburetor, owing to the possibility of putting the air scoop on top of the engine and reducing the amount of dust picked up in taxiing.

A very novel suggestion was made on temperature control, the authors proposing that the usual oil thermometer be supplemented by a series of thermocouples connected into various parts of the engine, the pilot being able to switch from one to another and read all the temperatures in succession.

A strong desire for improvement in lubrication was voiced. Means of warming the oil before starting the engine without removing it from the plane are particularly wanted. Oil coolers are considered too complicated, and rocker-arm lubrication takes too long and must be done too often for the operators' taste.

IN CLOSING, special attention was called to the desirability of making a larger use of the S.A.E. standards for interchangeability, and Mr. Lott went further to suggest that the operators could well agree among themselves on a general standard for a typical satisfactory cockpit layout. Almost all of the points treated had borne upon maintenance. A criticism of quite another type was directed against visibility, which was considered unsatisfactory in most present-day airplanes and which grew worse with the addition of cowling.

The discussion, which bore largely upon conditions of engine operation, was introduced by Marsden Ware of the Curtiss Company with a protest that the manufacturers could hardly be expected to rectify difficulties without knowing what they were, and a plea to the operators to make their grievances both plainly audible and very specific. His experience had been that a part-list furnished with an engine was likely to be considered purely ornamental, and when new material was required

Ship No. 27

To: Supt. Overhaul & Repair

November 18, 1929.

From: Asst. Supt. Overhaul & Repair

Subject: Repair Job No. 1061-E, 5477-A, 5481-A. Douglas Ship No. 27. Engine No. 32 removed after 262.05 hours. Engine No. 49 installed. Ship time since last overhaul 1851.01.

1. Radiator flushed and checked for leaks.
2. All new gas, oil and water hose installed.
3. Gravity fuel line insulated at left front cabane strut.
4. C-5 fuel pump overhauled.
5. Bronze seated 9-1 relief valve installed.
6. New starter shaft bolt installed.
7. All landing gear bolt holes rebushed.
8. Both oleo legs repacked.
9. Two reconditioned axles installed. (Drilled & packed for self oiling)
10. New brake control cables made up and installed.
11. New wheel bushings installed.
12. Fuselage brace wires station 8 tightened.
13. Engine torque control assembly rebushed.
14. Control stick assembly checked.
15. Exhaust pipes and heater manifold painted.
16. New left lower aileron installed.
17. All aileron hinge bearing holes rebushed.
18. Rudder bar pedestal rebushed.
19. Rudder bearings refitted.
20. New elevator control pulleys installed.
21. Elevator bearings refitted.
22. Stabilizer adjustment post overhauled.
23. Flares drop tested and bottom covers greased.
24. Experimental cockpit heater installed.
25. All necessary cowl repairs made.
26. Felt strip installed between cockpit cowl and fuselage.
27. Mail pit rain troughs installed.
28. Ship refueled after test.
29. Engine checked after test.
30. Battery cables treated.
31. Gas and oil lines checked for defects.
32. New safety belt and seat attachment fittings installed.
33. Ship inspected and O.K.'d by P. Richel.
34. Test flown by Pilot Burnside (1 hour, 20 minutes)
35. Ship accepted by Operations Inspector J. Baltrusis.

INSTRUMENT REPORT Job. No. 556-I.

1. Instrument panel No. 1 removed.
2. Compass changed, account sticking.
3. Turn indicator overhauled, new fork assembly.
4. Turn indicator venturi straightened and lines cleaned.
5. Air speed indicator checked O.K.
6. Air speed lines cleaned and connections renewed.
7. Tachometer checked O.K.
8. Altimeter checked O.K. Barometer scale reset.
9. Rate of climb checked O.K. Stop installed.
10. Hygrometer changed for new one and shock absorber felt installed.
11. All instruments numbered.
12. Compass compensated.

R. Dehority, Asst. Supt. Overhaul & Repair.

A Typical Record of Work Done on a Plane During Routine Overhaul

it was often described by the operator desiring it in terms utterly incomprehensible to the manufacturer.

Mr. Caminez of the Allison and the present writer raised several questions about the practice of running the engine at 20 per cent below its rated r.p.m., or about one-half its rated power, in cruising. Both believed that an engine that would stand no more than that had been given too high a rating and that the rated power should represent a condition of permissible steady operation, albeit some increase in life would result from cutting down the steady output. Mr. Lott rejoined that they would be glad to run the engine at higher power, but had in practice found that they could not do so with present-day engines without getting into trouble. The Bureau of Standards, said Dr. H. K. Cummings, would be glad to require that acceptance tests for approved type certificates be made at full power throughout, if that would be acceptable to the industry and to the operators. J. T. Hartson of the Comet Engine Company wanted to know if the operators would be interested in having purely commercial engines, designed independently of military types and capable of running 500 hr. between overhauls. Mr. Lott warmly welcomed the proposal. A Pratt & Whitney engineer remarked upon the unusual variety of practice among operators in respect of the length of time that their engines were allowed to run between overhauls. For Wasps the period was in some cases as short as 200 hr. and in others as long as 500, with a prospect that even that might soon be raised.

There had been some suggestion that military and commercial conditions were very widely different, but Commander Miles of the Navy minimized the differences

by reporting that military engines were being operated at about the same r.p.m. as those of N.A.T., and that the same sorts of operating troubles and the same problem of inaccurate description of troubles encountered in the field were present. He expressed surprise that corrosion had not been mentioned by the authors. The military services, and especially the Navy, found some of their most acute difficulties on that score.

The Curtiss Tanager's Aerodynamics

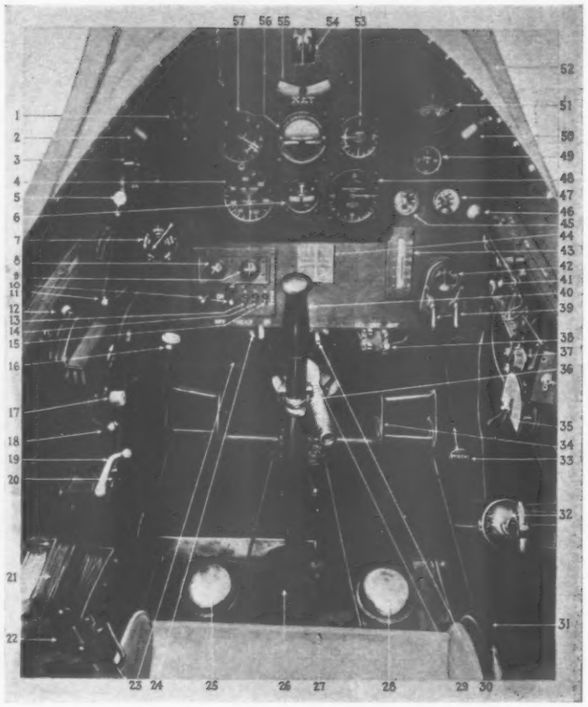
THE PAPER by T. P. Wright, Chief Engineer of the Curtiss Aeroplane and Motor Company, on "The Development of a Safe Airplane, The Curtiss Tanager" contained much material with which the readers of AVIATION are already familiar through the description published in this magazine [February 8, 1930]. Mr. Wright, however, gave out much more information than had previously been available upon the basic aerodynamic characteristics of the plane, and especially upon the wind tunnel work that preceded its design. The tunnel tests served both to determine the general aerodynamic form and to determine the loading to be used in making stress analysis for such unusual features of the construction as the floating ailerons and the auxiliary airfoil forming the slots. The maximum lift coefficient of the basic airfoil section used, the C-72, was .00329 on the familiar lb.-per-sq.-ft., m.p.h., "engineering" units. With the slots closed and the flaps down 32 deg. the figure was increased to .00444. With the flaps normal and the slots open, it went up to .00493, and with both slot and flap in action to their fullest extent, the increase was to .00605. The slot and flap therefore appear to be quite independent in their action, their combined effect in increasing the lift coefficient being almost exactly (within one per cent) the sum of their independent effects. The effect of the slot on the drag coefficient was relatively small, while the flap increased the minimum drag by some 400 per cent, that of course being in accord with general past experience. The completed model showed a maximum L/D of 10.06.

Unfortunately, no data were given on the tests of lateral and directional stability of a model with the floating ailerons and the slots operating. Mr. Wright indicated in the discussion that the yawing moment due to the ailerons was in all cases small, and was likely to be positive, rather than negative as with the ordinary aileron, under normal flying conditions. An interesting point on general design was implied in the remark "No special problem existed in the design of the tail surfaces of the Tanager." It had been generally believed by those who made a preliminary study of the conditions of the competition that the design of controls and stabilizing surfaces for proper longtitudinal demeanor would be a very serious one.

Superchargers

THE ENGINE SESSION was opened with Dr. Sanford A. Moss' discussion of geared centrifugal superchargers. Dr. Moss, who has of course been active in the design of this equipment for more than a dozen years on behalf of the General Electric Company, having co-operated in the Army's first supercharger tests at McCook Field, summarized the history of the device and the way in which the present airplane supercharger had been developed from the familiar centrifugal compressor. Dr. Moss warned his audience against the idea that a supercharger could be hung onto any engine as an accessory. For best results the engine must be fundamentally designed for supercharging. The speaker remarked, as the chairman had done in introducing him, that supercharging had ceased to be a narrow and special interest and had become a matter of universal practical concern with the general use of rotary distributors on radial engines. Supercharging could now be secured merely by changing the gear ratio on the impeller.

Dr. Moss especially recommended superchargers for favorable consideration on small engines, on which relatively greater power increases would be permissible than on the large ones. They have not yet had serious trial in that field. Among the indirect advantages of supercharging he mentioned the improved distribution and the partial scavenging of the clearance space of the en-



What an N.A.T. Pilot Thinks About.

1, Eight day clock. 2, Dash light. 3, Motive control for artificial horizon. 4, Air speed indicator. 5, Radiator shutter control. 6, Turn and bank indicator. 7, Master control for gas supply. 8, Compass light rheostat. 9, Dash light rheostat. 10, 200,000 candle power wing landing light switches. 11, Spark control. 12, Gas throttle. 13, Navigation light switch. 14, Dash light switch. 15, Compass light switch. 16, Landing wheel emergency brake. 17, Main gas tank supply control. 18, Gas mixture control. 19, Gas pressure hand pump. 20, Carburetor drain cock. 21, Ship's log and map cases. 22, Part of pilot's safety belt. 23, Cockpit heater manifold. 24, Cockpit heater control stick. 27, Edge of pilot's seat. 28, Aileron control control. 25, Aileron control pulley cover. 26, Boot around pulley cover. 29, Three way cockpit heater distributor. 30, Ignition emergency battery switch. 31, Stabilizer adjustment. 32, Hand fire extinguisher. 33, Pressure fire extinguisher for engine compartment. 34, Rudder bar and adjustable stirrups combined with alternating landing wheel foot brake controls. 35, Radio tuning control. 36, Dash light button. 37, Radio volume control. 38, Generator cut-out switch. 39, Engine ignition switches. 40, Aileron and elevator control stick. 41, Parachute flare control safety screw. 42, Generator ammeter. 43, Inclinometer. 44, Radio beacon code chart. 45, Oil pressure gauge. 46, Parachute flare control. 47. Water temperature gauge. 48, Engine speed r.p.m. 49, Fuel pressure gauge. 50, Dashlight. 51, Ice warning indicator. 52, Portion of transparent windshield. 53, Rate of climb indicator. 54, Floating magnetic compass. 55, Bank indicator. 56, Sperry artificial horizon indicator. 57, Altimeter.

gine by the fresh mixture put into it. Tests for which he presented the curves show that the effect of changing the gear ratio on the impeller from five to ten on a particular airplane was to cut the speed at sea level by ten miles an hour, but to increase that at 5,000 ft. by ten miles an hour. The maximum speed of flight was increased twelve miles per hour and was realized at 9,000 ft. altitude with the higher gear ratio, as against 3,000 ft. at the low one. The pressure rise in the intake manifold of a supercharged engine as now used ranges from two and one-half in. of mercury to a maximum of sixteen in., on the Curtiss Chieftain, and during the past year, the speaker said, the company with which he is connected built 5,000 supercharger impellers.

In a prepared discussion, Mr. Nutt, Chief Engineer of the Curtiss Company, spoke very highly of the supercharger for certain purposes, but called attention to the high cost and complex installation, especially for small engines. He thought the improvement in distribution due to supercharging to be very doubtful under some conditions, especially on Vee engines. Mr. Caminez suggested that the scavenging of the clearance space by the supercharger must lead to some fuel waste, part of the clean mixture being swept out of the exhaust barrels. Dr. Moss was unable to reply on a basis of direct test, but had found no evidence in practice of serious loss from that cause. Dr. George W. Lewis of the National Advisory Committee for Aeronautics expressed great confidence in the future of the supercharger and admiration for the work that Dr. Moss had done on its development.

Diesels for Aircraft

THE FEATURE of the S.A.E. dinner was another aeronautical engine paper, a full description of the Packard Diesel aircraft engine by Capt. L. M. Woolson of the Packard Company. It is unnecessary even to abstract the paper here, as it followed very closely, although with a different arrangement, the content of the description of the Diesel given in AVIATION [April 5, 1930]. The paper was, however, embellished with interpolated anecdotes not in the printed copy, the most entertaining relating to adventures during a recent flight to Florida and back. Having been forced down in a small field by bad weather on the return trip, Mr. Lees and Captain Woolson found the surface too soft to get off again, and consequently set out to reduce the fuel load. A barrel was secured and put underneath the tank outlet, and the draining of the fuel was begun in the presence of the usual admiring audience that attends on any aeronautical operation. After the barrel had accumulated a layer of oil several inches deep, it occurred to Mr. Lees to light a cigarette, casually tossing the match into the barrel to extinguish it. The disappearance of the audience was instantaneous.

The paper was also supported by a moving picture showing the process of disassembling the engine from its ready-to-run condition to complete breakdown in seventeen minutes.

Weight Saving Economics

ONE OF THE PAPERS at the airplane session was presented by the writer of the present review, and dealt with the question: "How Much is Lightness Worth in an Airplane?" It formed a companion piece to his contribution on the relation between speed and cost of operation at the S.A.E. meeting in Cleveland last fall, reported in AVIATION for September 7, 1929.

The argument, which was somewhat mathematical, need not be traced in detail. It was pointed out that the effects of direct weight savings in an airplane power plant or in the structure are greater than at first sight appear, since taking ten lb. out of the engine, for example, makes it possible to reduce the wing area slightly, to reduce the dimensions of structural members in correspondence with the decreased load falling upon them, and so on through the structure, the ultimate total weight reduction being about 25 lb. instead of the initial ten (on the assumption that the pay load remains unchanged). This reduction in size and weight permits of certain savings in maintenance, in fuel costs, and in first cost and consequently in depreciation, insurance, and interest on the investment. The reduction in first cost, however, would be predicated on the assumption that there was no counterbalancing increase in the inherent costliness of the type of construction used, and of course weight savings are generally attained either by using more expensive materials, lighter for their strength, or by introducing more refined methods of analysis and more complex and delicate constructional practices. The ultimate problem is to balance the increased cost of weight savings against the benefits received. Striking that balance, it was concluded in the paper that the actual value of a saving of one pound in the weight of the airplane structure is approximately $14, while for a saving in the engine the corresponding figure is approximately $11, the difference being due to the somewhat shorter normal operating life of the engine and consequently higher depreciation percentages.

The figures were not directly challenged in the discussion which ensued, but several speakers expressed the wish that the facts in the case and the enormous economic importance of weight control might be brought home to the operators as well as to the manufacturers. The present tendency of many operators is to load in equipment without mercy. One speaker also made the suggestion, which the author of the paper warmly endorsed, that savings in the weight of auxiliary equipment had approximately the same unit value as if they had been made in engine or airplane, and that much more attention should be given to designing light tools and other accessories. C. J. McCarthy of the Vought Company, acting as chairman, agreed in principle to all that had been said about the importance of weight saving, but protested the difficulty that the engineer encountered with the production department. They were always eager to save weight, but insisted that the reduction should be accompanied by a decrease of cost rather than an increase. In response to that the author of the paper emphasized again a warning, already given in presenting the manuscript, against overestimating the range of application of the figures that had been computed.

They were considered to apply correctly to transport aviation in general, but not to military planes, nor to machines for the use of the private owner, nor to any other case in which first cost was a direct and important element in determining the possibility of purchase, its direct significance being likely to overshadow the value of operating economies distributed over the entire life of the equipment.

Gliders and Their Structure

THE NEXT PAPER was a very welcome one, for in the great mass of material upon gliding that has been presented to the public in the last few months there have been very few discussions of the fundamentals of structural and aerodynamic design by competent aeronautical

engineers. The general tendency has been to follow German practice almost unquestioningly, or at most to develop by trial and error certain considerations of design which were then held as a trade secret within the organization where they originated. In his extended treatment of "Glider Design" at this Detroit meeting, William J. Perfield of the Stout Engineering Laboratories and of the University of Detroit lifted the veil.

Mr. Perfield viewed the present spread of home design and construction based on inadequate engineering knowledge with frank alarm, especially taken in conjunction with the increased use of auto towing to very considerable altitudes and at considerable speed. He regretted, as AVIATION has done editorially, the present unsatisfactory state of knowledge upon the precise conditions to which a glider is subject.

STARTING with consideration of a primary glider and with the assumption that such a machine will weigh 200 lb. or a little less, Mr. Perfield calculated the necessary wing area at from 160 to 175 sq.ft., as he considered that the wing loading should remain very close to two lb. per sq. ft. His recommendations for an airfoil section were for a high lift coefficient, good maximum L/D, and a thickness of about twelve per cent of the chord in the case of a primary machine with some external bracing. The Clark Y and U.S.A. 35B were noted as particularly suitable together with several of the Göttingen sections.

The problem of balance is serious, since the center of gravity of the pilot's body must be approximately at the leading edge of the wing in order to keep the total center of gravity far enough forward for proper longitudinal stability. Variations in the pilot's weight may shift the center of gravity in extreme cases by as much as six inches. It was suggested that an adjustable seat to keep the balance constant for all pilots would be exceedingly desirable.

While Mr. Perfield accepted the open-fuselage type of primary glider and recognized its advantages for training pilots and for easy repair, he spoke very favorably of some system of partial inclosure or of a removable cowling which would permit inclosure of the pilot's body after it had passed the very earliest stages of its construction. Such a device is now in use by one of the German clubs, and is reported to decrease the gliding angle of the ship from one in eight to one in twelve.

A number of the audience received a surprise when the author came out in advocacy of automobile towing in preference to shock-cord launching for instruction. He considered it safer and less confusing, owing to the absence of violent acceleration. It had also the great advantage of eliminating shock-cord flying's greatest handicap, the necessity of collecting a large launching crew and keeping them hard at work. The necessity for extreme caution in starting novices in auto-towed flight was of course emphasized. The speed of the vehicle must be closely controlled to keep the machine from getting too far in the air on the first trials.

Mr. Perfield favored a simple skid landing gear, such as that on the German Zögling, especially when launching is to be by shock cord. Shock absorption above the skid is possible and would be very helpful, but types so far developed were not recommended. The most severe stresses in the landing gear arise in cross-wind or side-slip landings, as there is little lateral staying for the skid. A point particularly stressed, and likely to be overlooked by those accustomed only to the power airplane, is the need for a continuous curvature of the runner on the bottom of the skid to permit of using it as a rocker and varying the angle of attack at will during the take-off.

When auto towing is to be used, a wheel landing gear is very helpful. A 16 x 7 air wheel running at about a 5 lb. pressure was suggested. Whether with wheels or with skids, Mr. Perfield recommended that the normal ground angle of the machine should not exceed 12 deg., thus reducing the liability of stalling during a take-off.

In the fuselage design a major consideration is the case of assembly and transport, and it is ordinarily secured by using a single type of fuselage with a substantial amount of external wire bracing. That of course increases the amount of rigging required in re-assembly, but Mr. Perfield suggested no radical departures. Structurally, he said, it is of the utmost importance that wood members near the pilot be wrapped to prevent splintering and that the safety belt be of sufficient strength and firmly anchored, a precaution sometimes neglected.

There are no unusual features in glider wing construction, except the use of more than the ordinary amount of plywood covering to secure rigidity and to protect the wing tips against bad landings. A covering over the under surface of the tip was particularly recommended, with the possible addition of wing skids. Fabric is commonly attached by gluing rather than sewing, and the author indicated that a completed wing should, notwithstanding the relative crudity of construction in the interest of cheapness, weigh not over 0.6 lb. per sq.in. German practice has been to use wire bracing entirely for the wings, and that has so far been copied on almost all primary machines in the United States, but struts have a great advantage in simplicity of rigging and Mr. Perfield did not consider them appreciably to increase the cost of original manufacture. The struts have the additional advantage that they should not be stretched beyond their elastic limit and should therefore require no adjustment, whereas wires often stretch in landing and require re-rigging.

The open fuselage of a primary glider, with the lateral area provided for the pilot's body very far forward, makes unusually large vertical tail surfaces desirable, and Mr. Perfield recommended a total rudder and fin area of about nine per cent of the wing area. Horizontal tail surfaces and ailerons can be of approximately the same proportions as those of a powered airplane.

THE PROVISION for launching by shock cord occasions no difficulty to the designer. The design of a releasing mechanism for towing is a somewhat more elaborate problem, upon which Mr. Perfield went into detail. Of special importance, as he pointed out, is the design of a mechanism which will drop the rope from any angle, as a tow rope may sometimes break and it is then necessary to release it to avoid fouling objects on the ground. A hanging rope will of course trail back of the vertical, and the simpler forms of releasing mechanism may not let it go from that angle.

In conclusion, the subject of stress analysis was treated, but treated with considerable brevity because of lack of full information upon which to base a logical analysis at the present time. The Department of Commerce has imposed certain load factors, but they are to a considerable degree experimental. In any case, as the author called to his audience's attention, handling stresses are likely to be more serious than those arising in flight, and a glider designed to have reasonably long life under the conditions that it must encounter on the ground is likely to be well protected against air load, although of course a full stress analysis remains desirable.

GENERAL NEWS

HERBERT F. POWELL, *News Editor*

HIGH POINTS in the NEWS

▶ *Wasp minus carburetor.* Test Pratt & Whitney Wasp engine using an atomizing device in place of a carburetor, thus permitting use of either gasoline or furnace oil.

▶ *All-American figures.* Announce 187,622 (65 per cent adults), attended the Third Annual All-American Aircraft Show. Report $1,541,559 sales.

▶ *Alter tour rules.* New scoring formula among changes made in National Air Tour regulations for 1930.

▶ *Lower Sikorsky, Fairchild prices.* Sikorsky S-38 was $56,800, now $49,800; Fairchild KR-21 was $4,685, now $4,125.

▶ *More miles; less accidents.* Figures released by Col. Clarence M. Young show there were 924 mishaps for the 78,940,161 mi. flown last half '29.

▶ *Spin test modified.* Colonel Young declares spinning tests for light planes seeking approved type certificates are no longer mandatory. However, if conditions warrant, a spin recovery demonstration will be asked for.

Airports and Airlines

▶ *More direct P.A.A. route.* With the inauguration on April 26 of seven-day New York-Buenos Aires-Montevideo route, Pan American Airways announces a more direct trip will be made across the Carribean to the Canal Zone.

▶ *To open five mail bids.* Starting April 28, bids will be received in the office of Second Assistant Postmaster General W. Irving Glover for two months operation of five of the air mail routes.

▶ *Latest U.A.&T.-N.A.T. phase.* United secures restraining order through a Wilmington (Del.) official to prevent National Air Transport from exchanging stock with Eastern Air Transport which would give N.A.T. control of that company.

Foreign

▶ *Only five world records.* Federation Aeronautique Internationale now lists only five marks as "World Records," while achievements in the various plane and seaplane classifications will be called "International Records."

Army Orders 100 D-12-E's

WASHINGTON (D. C.) — Curtiss Aeroplane & Motor Co., Garden City, L. I., N. Y., has received an Army order amounting to $660,280 for 100 Curtiss D-12-E engines and certain spare parts. These will be installed in A-3B attack planes previously ordered from the Curtiss firm.

Handle 122 Violations In First Quarter of 1930

WASHINGTON (D. C.)—During the first three months of 1930, the Aeronautics Branch handled 122 violations of the Air Commerce Regulations of which number 22 cases are still pending, states Col. Clarence M. Young.

"Fines in the amount of $550 were assessed and collected for this three-month period," Colonel Young said, "and penalties in the form of 31 reprimands, 30 suspensions, two revocations, and two denials of licenses, were meted out for the violations. In twenty cases, evidence was produced which justified dismissal.

"Violations of the Air Commerce Regulations dealing with aerobatics were greater than any other specific offense, the number being 28. Violations of the low flying prohibitions ranked second, with twenty; unlicensed pilots flying licensed planes, fourteen; flying without navigation lights, five; and flying without identification numbers, three. Miscellaneous offenses numbered 52."

Parley to Consider Plane Carrier Limits

LONDON (ENG.)—As AVIATION goes to press, a plenary session of the London Naval Arms Conference is about to take place at which time the limitation of aircraft carriers of over 10,000 tons or the general limitation of all carriers will be considered for drafting into the three-chapter treaty now planned.

The United States has not started construction of any plane carriers since the Washington Conference of 1922. However, counting a carrier planned but not yet begun, America's tonnage, with the "Lexington" and the "Saratoga," would amount to 90,000 in that class of ships.

P. & W. Develops New Feed System

Carburetor Eliminated; Engine Burns Oil or Gas

HARTFORD (CONN.) — A device which eliminates the usual carburetor and intake system of the gasoline engine and permits the use of fuel ranging from ordinary furnace oil to high-test aviation gasoline has been perfected by the Pratt & Whitney Aircraft Co., and was demonstrated last week at Brainard Field before aviation officials and newspaper men.

While the device has been developed from the point of view of the aviation engine, it is equally adaptable to automobile or other gasoline engines, according to P. & W. officials. It has been used successfully for 6,000 mi. in an old model T Ford.

The new system was demonstrated on a standard Pratt & Whitney Wasp from which the carburetor had been removed. The engine powered a Boeing pursuit plane, which was put through most exacting military maneuvers by Lieut. A. Lewis MacClain, test pilot of the company. The device substitutes atomization for carburetion and measures the fuel precisely, delivering it mechanically to each cylinder through independent lines.

From One Tank to Other

So complete is the atomization that the highest and the lowest test fuel may be used. In the tests, aviation gasoline was carried in one tank and furnace oil in another. While engaged in maneuvers, Lieutenant MacClain changed at will from one to the other tank.

Pratt & Whitney engineers say that the system, when using gasoline, develops greater power than the ordinary system of carburetion and provides efficient operation regardless of the temperature of the engine or its position in the air. During the tests, the pilot idled the engine at a high altitude and thoroughly cooled the engine. As he neared the ground with the air screw barely turning over, he "gunned" the engine and climbed steeply to about 2,000 ft. There was no sputter, as is usually heard with a cold power plant. This test was made with both furnace oil and gasoline. With this device, cold starting is greatly facilitated, and the difficulty previously encountered with ice formation in the carburetors during winter operation is believed to be eliminated.

The fuel is sprayed into each cylinder, where it is mixed with air from the intake valve. High pressure pumps

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Draft New Tour Scoring Formula

Displacement Replaced By Horsepower Factor

DETROIT (MICH.) — The new rules and formula governing the 1930 National Air Tour for the Edsel B. Ford airplane reliability trophy were discussed by approximately forty pilots and aircraft manufacturers in session with the Tour Committee at the Detroit Athletic Club during the All-American Aircraft Show here. The dinner meeting was presided over by William B. Mayo, chief engineer, Ford Motor Co., and Chairman of the Tour Committee.

The new scoring formula, which was decided upon after considerable thought and after nearly a dozen other suggested formulae had been mulled over and discarded, will be as follows:

$$\text{Leg Score} = \left(\frac{\text{Dept. of Com. Contest Load}}{\text{Dept. of Com. Horsepower}} + \frac{150}{\text{Stick} + \text{Unstick} + 10} \right) \times \text{Leg Speed.}$$

Other than some revision intended to encourage the participation of amphibion type craft and the placing of a bonus on the comfort giving qualities of cabin type planes, the rules are very much like those that have been used in past years. However, going through the suggested regulations from beginning to end, one finds the following differences:

Every competing plane must have had an A.T.C. at least 30 days prior to the start of the Tour. (Last year this was 15 days.)

Ruling Effects Propellers

Following the preliminary tests at Ford Airport, a competing pilot will be permitted to reduce his contest load to 85 per cent of the maximum allowed by the Department of Commerce. (Last year a reduction to 75 per cent of this maximum load was permitted.) Whether or not mufflers will be considered as part of a plane's contest load is to be decided later.

Pitch of the propeller or propellers used in any competing plane must be constant throughout the Tour, unless the propeller is adjustable from the cockpit. (This, a new rule, evoked considerable discussion at the meeting.)

No plane will be given credit for a leg score unless it averages 50 m.p.h. or better over the leg in question. (This, also, is a new rule.)

In determining the stick and unstick time for competing planes the judges will use an average of two trials rather than the best time of the trials as used heretofore.

Multi-engined craft will be allowed the usual reduction of horsepower in the formula, provided they can remain above 6,000 ft. for 15 min. with only the least efficient combination of their engines in operation. Horsepower is considered in this concession instead of piston displacement because horsepower is used in the formula rather than displacement. Another difference is that multi-engined craft are required to remain at a high altitude with one engine contributing no thrust instead of being required to climb from a lower altitude as has been the case heretofore.

Amphibion type craft will be given credit of 5 per cent of the craft's Department of Commerce empty weight, which will be added to the contest load used in the formula. The same concession is granted cabin type planes when the equipment of the machine includes articles specified in the rules. Should an amphibion type craft also be a cabin plane, which is generally the case, credit of 10 per cent will be given. Those present at the meeting seemed willing to allow the 5 per cent credit for amphibion type craft, but some of them thought the 5 per cent concession in the case of cabin planes was insufficient. This percentage is to be decided later.

Offer Great Lakes Trophy

A rule providing for awarding of the Great Lakes trophy for light engined planes has been written into the Tour regulations. This trophy, put up by Great Lakes Aircraft Corp., will go to the plane powered by an engine of 510 cu.in. displacement, or less, which accumulates the highest score under National Air Tour rules.

The most striking changes in the formula are the inclusion of a horsepower factor to replace piston displacement and the inclusion of leg speed rather than maximum speed shown in pre-Tour tests. The leg speed factor, it is believed, will add zest to the contest and increase public interest for the simple reason that standings will fluctuate from day to day. This, also, will bring into major consideration the piloting ability of contestants. With incorporation of leg speed in the formula the speed tests usually conducted at Ford Airport prior to the Tour will not be needed.

Mid-September Start Planned

It is hoped to hold the Tour this year about two weeks after the close of the National Air Races at Chicago. The Committee has suggested Saturday, Sept. 13, or Saturday, Sept. 20, as starting dates. The route which seems to be most favorable to all concerned, but which has not yet been definitely decided upon, would take the Tour planes from Detroit to Chicago, thence through Milwaukee and St. Paul into Winnipeg, Can. Following visits to Regina and other cities in Southwestern Canada, this route would lead southward into the United States at Spokane, Wash., from where it would go to Salt Lake City, Denver, and Colorado Springs. From Colorado it has been proposed to journey southward to Wichita Falls, Tex., thence northeastward through Tennessee and Ohio to the starting point.

Capt. Ray Collins, manager of the Tour, explained that the suggested rules and suggested routes would be mailed out to manufacturers within the next 10 days.

Those attending the meeting here, besides Mr. Mayo and Captain Collins, included Maj. Thomas Lanphier, James Ray, George W. Haldeman, Guiseppe M. Bellanca, Roger Q. Williams, Carl Schory, E. J. Hicks, E. P. Crocker, Prof. Peter Altman, Arthur G. Schlosser, C. V. Burnett, E. M. Laird, Ralph H. Upson, William Wellborn, Maj. J. Carroll Cone, E. W. Cleveland, George Chapline, Robert E. Lees, John H. Livingston, Capt. L. M. Woolson, C. H. Huntington, Lee Brutus, J. E. Rouell, William A. Ong, L. A. Faunce, L. A. Majner, M. B. Gordon, A. K. Rapelje, and others.

P. & W. Has Oil Engine

(*Concluded from Page* 815)

force the fuel into the head of each cylinder. The throttle controls both the fuel stream and the air to the intake valve.

These pumps, and the absence of the carburetor and float, make it possible to fly the plane in any possible position without loss of power. Pilot MacClain flew for a considerable time in inverted flight during the tests, with the engine functioning perfectly. Each test was repeated with furnace oil as fuel.

A point of utmost importance in aviation is the fact that no weight is added to the power plant with the new Pratt & Whitney device. The equipment replacing the carburetor system weighs approximately the same, and the horsepower remains identical.

The device was originally evolved by Stephen A. Hasbrouck, an engineer of the Pratt & Whitney Company, and has been developed by the company engineers under the direction of George J. Mead, vice-president in charge of engineering. The device is covered by patents of Mr. Hasbrouck and others pending by the company's engineering department.

The new system will not be put into production for six months or more, according to Mr. Mead, as the company will follow its usual practice and test the new feature extensively in all parts of the country under all flying conditions, before offering it as regular equipment.

While the tests have so far been made with a standard Wasp, the engineers intimated that the engine itself will be developed to give the utmost efficiency with the new device.

Make Change in Cirrus Derby

DETROIT (MICH.)—The All-American Flying Derby, [AVIATION, March 22, p. 617] a 7,586-mi. plane race touching in three countries and for which American Cirrus Engines, Inc., Marysville, Mich., is sponsor, will start from Detroit City Airport, July 21, instead of from New York City as was originally planned.

Thirty Planes Listed For Tri-State Display

CAMDEN (N. J.)—Flying activities are expected to swing into a summer stride and a marked increase in passenger business is being anticipated as a result of the Tri-State Aircraft Show being held in Convention Hall, Camden, N. J., April 18-26. The show is the first official regional display for the tri-state area and could almost be called the first major effort of the industry to outline a definite sales program in this territory.

Conducted by the Camden Chamber of Commerce and sanctioned by the Aeronautical Chamber of Commerce, the exposition has already aroused an aviation interest unlooked for so early in the season. The three states of Delaware, Pennsylvania, and New Jersey have joined to make the affair an annual event and any previous local feeling has been submerged.

Tickets Go Toward Rides

Tickets to the show are being redeemed at face value on presentation of stubs at Central Airport for passenger hops. The attraction of such a reduction has caused airport authorities and operators of scenic flight lines to prepare for a volume of business during the eight days of the show even greater than during the entire past year.

The show committee has succeeded in lining up many added attractions for the public aside from the commercial exhibits. The Post Office Department, Department of Commerce, Weather Bureau, Army, Navy and War Departments have all been granted space on the floor.

The Convention Hall itself is located but 4 min. by motor from Central Airport and 15 min. over the Delaware River Bridge from the center of Philadelphia, and faces the highway leading to Jersey shore resorts.

Program Described

Each of the eight days program is designated to honor either a famous flier or group, making the social calendar a highly important part of the show. On Famous Fliers' Day, April 21, the "Los Angeles" will keep afloat above the city and the exposition's headquarters by orders of the Navy Department, it is announced, and will remain at Camden until sunset. Col. Clarence Chamberlin and Capt. Frank M. Hawks have both promised to attend the ceremonies during the day, while a luncheon held in their honor is expected to attract a number of prominent aviators to the show.

The following day the exposition will be visited by Amelia Earhart and a group of the "99's" from New York. This program was arranged by girl fliers in Philadelphia section and vicinity. The governors of New Jersey, Pennsylvania, Delaware, and Connecticut will head delegations from their states to the aircraft show on days appointed in their honor.

Virtually all of the floor space has been subscribed for, and aside from the 30 planes entered, there will be about forty-five booths devoted to aircraft engines and accessories. The planes will land at Central Airport April 17 for an airplane parade from the landing field to the exhibition hall. The parade, to be the first ever seen here, has aroused considerable interest and has become a feature of the show's program. Another section of the parade will depict the various stages of transportation from the primitive ox cart, the covered wagon, and the antiquated automobile of early in the century, to the most modern of air transports.

Planes on Exhibit

Planes to be shown include two Wacos, two Aeromarine Klemms, Bird, Barling, Loening Commuter, Fairchild, Imperial, Robin Challenger, OX Robin, Fleet, Stinson, Ford de luxe club plane, Travel Air, Eaglerock, Uppercu-Burnelli, Waco glider, Imperial glider, Lockheed Vega, Gipsy Moth, Ryan, Bellanca, Mailwing, Sportwing, KR-21 Trainer, Standard, Davis, Monocoupe, Wright J6-5 KR-34, Stinson Junior, and Aristocrat.

Hold Iowa Conference May 9-10

DES MOINES (IOWA)—The Second Iowa Aeronautics Conference will be held at Iowa State College, Ames, Iowa, May 9-10. In connection with this, Ames Post No. 37, American Legion, will hold an air meet at its airport on May 10-11. The Aeronautics Conference will be under the direction of the Engineering Extension Service and the Aeronautical Engineering Section of the Mechanical Engineering Department, Iowa State College.

Navy's New Bomber

THIS IS the initial Three-Purpose Bomber of a series of eighteen being built for the Navy by the Great Lakes Aircraft Corp. [AVIATION, April 12, p. 774]. A Pratt & Whitney 525 hp. Hornet powers the folding-wing craft.

Detroit Show Draws 187,622

Set Exposition Sales At $1,500,000 Mark

DETROIT (MICH.) — With total sales reported by plane manufacturers to have reached the million and one-half dollar mark and with attendance announced to have totaled 187,622, approximately 65 per cent of whom were adults, the Third Annual All-American Aircraft Show ended here Sunday evening, April 13, stamped by the industry as an outstanding success.

Of the plane sales figure of $1,541,559, retail purchases were set at $841,817 and dealer sales at $699,742. Two-hundred forty-three aircraft were asserted to have been ordered, with 157 going to dealers and 86 to the retail trade. Of 95 gliders contracted, 80 went to dealers and fifteen to retail buyers. Interest in gliders was unusually strong, with such craft displayed by Gliders, Inc., (D.A.C.), Alexander, Cessna, Bowlus, Franklin Brothers, Waco, and others.

Many Fly Diesel Planes

Outstanding, of course, was the interest in the Packard Diesel power plant introduced to the public at this show. Numerous pilots took advantage of the opportunity of flying diesel-powered planes from the show field.

Several operators used the temporary night flying facilities offered at the field. A very good "joy hopping" business over Detroit was the result. Incidentally, it was revealed by definite check that landings and takeoffs at the field during the last six days of the show numbered more than forty-two hundred.

The total attendance of 187,622 constituted a major show record. Detroit's figure in '28 was 125,000. Prompted by the success, the Show Committee of the Detroit Board of Commerce, headed by Edward S. Evans and William Mayo, has addressed a letter to the Aeronautical Chamber of Commerce asking that Detroit be awarded the Class A International Exposition for 1931. The name "All-American" would not apply should this request be granted, but the Detroit interests involved have expressed a desire that such a show be managed by the Aircraft Bureau of the Detroit Board of Commerce.

New Coast Firm Expands

SAN FRANCISCO (CALIF.) — The United States Aircraft Corp., Ltd., this city, has been formed and has taken over the airplane manufacturing department of Marchetti Motor Patents, Inc., and its airport, plants, and property located near Mills Feld. The new company has also acquired the Malley-Long Furniture Manufacturing Co., of this city, and plans to use its facilities for the construction of wood parts of airplane wings and fuselages.

Aero Accident Figures Released

Mishaps Last Half of 1929 Were 924 for 78,940,161 Mi.

WASHINGTON (D. C.) — The total number of miles flown per accident in civil aeronautics during the last six months of 1929 is shown to have increased over the same period in 1928 in the semi-annual report of aircraft accidents recently made public by Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics.

Between July and December last year civil aircraft flew a total of 78,940,161 mi. in air transport and miscellaneous operations, an increase of approximately 25,000,000 mi. over the corresponding period the previous year. (Air transport includes aircraft which carry passengers, mail, or express on scheduled service over regularly established routes; and miscellaneous operations cover student instruction, experimental, commercial, and pleasure flying.)

Transport Crashes Totaled 76

In scheduled air transport operations for the last half of 1929, the report shows there were 15,940,161 mi. flown, and as there were fifteen fatal accidents, the mileage flown for each fatal accident was therefore 1,062,677. In 1928 for the same period, there were 6,188,838 mi. flown and seven fatal accidents, which placed the miles per fatal accident at 884,120.

Considering all classes of accidents, including those referred to above as well as all others, the miles flown per accident in scheduled air transport operations for the last half of 1929 totaled 209,739 as there were 76 accidents. For the corresponding period in 1928, the total number of accidents was 51, which placed the miles per accident at 121,350.

As there was a total of 63,000,000 mi. flown in miscellaneous operations in the 1929 period and 168 fatal accidents, the miles flown per fatal accident in this class amounted to 375,000. In the same period in 1928, the total mileage was 48,000,000, the number of fatal accidents was 123, making miles flown per fatal accident 390,244.

Fatal Mishaps Numbered 183

The total number of all classes of accidents reported in the 1929 six-month period in miscellaneous operations was 848, which brought the miles per accident in miscellaneous operations to 74,292. For the same period in 1928, the records show 74,883 mi. flown per accident, based on a total number of 641 accidents.

Carried out further to take in the total mileage flown in all classes of aircraft operations for each fatal accident, the figures show there was one fatal accident in the last half of 1929 for every 431,367 mi. flown. The total number of fatal accidents for this period was 183, while the total miles flown was nearly 79,000,000, as previously set forth. For the corresponding period of 1928, however, the number of fatal accidents in all classes of operations was 130, and the miles flown were 54,188,838, giving a total mileage per fatal accident in all classes of flying of 416,837.

From the standpoint of mileage flown per accident in all classes of civil aircraft operations and for all classes of accidents throughout the United States for the last half of 1929, the reports show a total of 924 accidents, which placed the total mileage per accident at 85,433. For the last half of 1928, there were 692 accidents of all kinds, and a total mileage of 78,308 per accident for all classes of operation.

Direct comparisons only have been made between the mileage flown and the number of accidents in the last half of 1929 and the last half of 1928. This was done because weather conditions during the last six months of the calendar year are more favorable for flying than during the first six months, and this fact, therefore, is reflected in the totals.

The Aeronautics Branch believes that due to the shortage of field personnel for carrying on the work, there doubtless were some unreported accidents in 1928, in which event, the increase in mileage flown per accident in 1929 over 1928 would be even greater than shown in the report.

The causes of accidents are divided into four major classifications—personnel, power plant failures, plane failures, and miscellaneous. There is a fifth category given over to undetermined and doubtful causes.

The largest percentage of the accidents was attributed to personnel, the total being 55.75 per cent. The next largest cause was credited to power plant failures, which amounted to 18.95 per cent. Airplane structural failures contributed 11.26 per cent, and miscellaneous, 8.47 per cent.

To Issue Three-Year Report

In the miscellaneous class, weather was credited with 4.12 per cent; airport and terrain, 2.12 per cent, darkness, 0.61 per cent, and other causes not falling under the general classifications, 1.62 per cent. The percentage of undetermined and doubtful causes was 5.57 per cent.

The accident report is based on the findings of the Accident Board of the Aeronautics Branch, which is composed of two expert pilots, a flight surgeon, an aeronautical engineer, a lawyer versed in air law, and a statistician.

This Board investigates and determines the causes of all civil aircraft accidents, analyzes all accidents reported from the field, and reduces them to their causation factors expressed in percentage. The statistics gathered from the work of this accident analysis have proved to be of great value, particularly by pointing to ways and means of decreasing the number of aircraft accidents. They also are of great assistance in the development of certain structural and flying characteristics in aircraft.

Printed copies of the complete report, giving comparative statistics and analyses of accidents in civil aeronautics for the years 1927, 1928, and 1929, soon will be available without charge upon request to the Aeronautics Branch of the Department of Commerce.

May Fly Do.X Here

Lieut. C. H. Schildhauer

IT IS STATED that when the Dornier Do.X takes off from Lake Constance sometime this summer with this country as its final destination, it is likely that Lieut. Clarence H. Schildhauer will be at the controls. He has received a query from Dr. Claudius Dornier concerning such a proposition and will sail for Europe shortly to confer with him on the matter.

Lieut. C. H. Schildhauer, who was born at New Holstein, Wis., in 1895, entered the transport and torpedo service during the war after leaving the U. S. Naval Academy. In 1925, he created a new world record for seaplane duration, staying aloft 27 hr. 37 min. 30 sec. Lieutenant Schildhauer is now connected with the Aviation Division of General Motors, which firm represents Dornier in America.

Douglas and B-J Fail to Merge

NEW YORK (N.Y.)—Merger of the Berliner-Joyce Aircraft Corp., Baltimore, Md., with the Douglas Aircraft Corp., Santa Monica, Calif. [AVIATION, March 22, p. 617] was not consummated, it has been learned here. There is, however, a likelihood that the firms will yet consolidate.

N.S.P.A. Aero Branch Holds Detroit Meeting

DETROIT (MICH.)—The Aeronautical Committee of the National Standard Parts Association met at that organization's headquarters here on April 9, during the All-American Show, under the chairmanship of E. A. Watkins, of the Watkins Mfg. Co., Wichita, Kan.

It was brought out at the conference that approximately 40 per cent of the N.S.P.A. members were producing parts, tools, or material used as original or replacement equipment in aircraft. Therefore attention of the group was devoted largely to the consideration of making established automotive parts jobbers wholesalers to the aviation industry.

This suggestion, however, was supplemented by the thought that at the present time there is not yet available a sufficient volume of business in engine replacement parts to warrant investment in a stock of them by the average automotive parts jobber.

On the other hand, shop tools and equipment for servicing the automobile motor are largely the same as those needed for servicing aviation engines, and the automotive parts jobber is in an excellent position to handle airport service station requirements along this line, according to the committee.

The members of the committee, in addition to chairman Watkins, are: B. N. MacGregor, Packard Electric Co.; R. W. Conroy, Russell Mfg. Co.; Allen Morton, American Hammered Piston Ring Co.; J. G. Young, Hutto Engineering Co.; L. H. Phelps, Phelps-Roberts Corp.; George Newbold, business department, AVIATION Magazine, counsel of committee.

Five More Planes Receive ATC's

WASHINGTON (D. C.)—The Department of Commerce has issued five more approved type certificates for aircraft. According to certificate number, make and designation, type, power plant, weight empty, useful load, and gross weight, the following planes were the recipients: No. 305—Stearman 4-D, three-place open biplane, Wasp Junior, 2,297 lb., 1,503 lb., 3,800 lb.; No. 306—Mono Monocoupe 90, two-place closed monoplane, Lambert 90 hp., 859 lb., 591 lb., 1,450 lb.; No. 307—Ford 9-A, thirteen-place closed monoplane, three Wasp Juniors, 6,863 lb., 3,267 lb., 10,130 lb.; No. 308—Lockheed Vega DL-1, seven-place closed monoplane, Wasp, 2,563 lb., 1,707 lb., 4,270 lb.; No. 309—Curtiss Robin 4C-1A, four-place closed monoplane, Challenger, 1,811 lb., 1,039 lb., 2,850 lb.

American Eagle Orders Kinners

GLENDALE (CALIF.)—An announcement states that Kinner Airplane & Motor Corp. has received a contract from the American Eagle Aircraft Corp. to supply that firm with $230,000 worth of engines.

O.K. Air Travel by Gov. Men

PORTLAND (ORE.)—Approval of air travel for government officials and employees when traveling on official business has been given by Comptroller General John Raymond McCarl. A letter to this effect has been received by Clifford Mutchler, general manager of West Coast Air Transport, from Col. Clarence M. Young. In the communication, McCarl stated that no objection would be made to reimbursing federal travelers for plane transportation expenses or to requests for the use of such travel if rail costs, including Pullman, were similar.

Light Plane Spin Test For ATC Not Mandatory

WASHINGTON (D. C.)—Prescribed spin tests for light planes being examined for approved type certificates will no longer be mandatory, declares Col. Clarence M. Young, Assistant Secretary of Commerce for Aeronautics.

"Although the Department of Commerce has removed the mandatory clause for specified spin tests," Colonel Young explained, "it reserves the right to order a demonstration of spinning characteristics of light aircraft when in the opinion of the Department such a demonstration is warranted.

"Light aircraft, under the Airworthiness Requirements regulations, are defined as including 'airplanes in which the power loading is greater than 30 lb. per horsepower, and aircraft, heavier than air, without power plant.'"

The text of the amendment follows:

"Aeronautics Bulletin 7-A, Airworthiness Requirements, Section 1, Part 3, Paragraph 11, is hereby amended by deleting the last sentence of said paragraph, which reads as follows:

" 'A demonstration shall be made to show that the light aircraft will readily recover from spins after spinning at least six turns with the center of gravity in the rearmost position likely to be encountered in its normal use,' and substituting therefor, the following:

" 'When in the opinion of the Department of Commerce, the flight characteristics are such as to warrant, a demonstration shall be made to show that the light aircraft will readily recover from spin maneuvers.' "

Acquire Bowlus Coast Teaching

LOS ANGELES (CALIF.) — Pacific Coast Gliders, Inc., has taken over the Pacific Coast rights to the Hawley Bowlus glider flying instruction system and plans a chain of some twenty gliding schools of the Coast, using Bowlus tow gliders as equipment for primary training and Bowlus Sailplanes for advanced instruction. Headquarters for the chain and a gliding school have been opened in Los Angeles, the Bowlus school in San Diego has been taken over, and other schools will be established up and down the coast as rapidly as equipment can be obtained.

Sikorsky, Fairchild Lower Plane Prices

S-38 is Cut to $49,800; KR-21 Trainer Now $4,125

NEW YORK (N. Y.)—Announcements of aircraft price cuts continue to be received with the latest slashes listed by the Sikorsky Aviation Corp., Bridgeport, Conn., and the Fairchild Airplane Mfg., Corp., Farmingdale, L. I., N. Y.

Sikorsky states it has reduced the Wasp-powered S-38 selling price by $7,000, thus making the new figure $49,800. Incidentally the new four-place, single-engined, baby amphibion, S-39 introduced at the Detroit Show is to be marketed at $17,500. This craft employes the Wasp-Junior plant.

Flyaway factory, the price of the Model KR-21 Kenner Fairchild Trainer is now $4,125 while it formerly was priced at $4,685.

When the six Fairchild "71's" are delivered to the Department of National Defence, Canada, this month, there will then be 36 Fairchilds owned by that department and used for official transportation, aerial photography, and forest patrol.

New dealers have been appointed as follows: for District of Columbia, Washington Flying Service, Inc., Washington Airport, South Washington, Va.; for Arizona, Arizona Air Service, Inc., Phoenix, Ariz.; for Wicomico County, Md., Starlighters, Inc.; for Detroit and vicinity, Mr. Pat Tuohey, 2434 Sturtevant Ave., Detroit, Mich.; for Stanislaus County, Calif., Nightingale Aircraft Co., Modesto Airport, Modesto, Calif.

Gross sales of $3,494,000 for Fairchild, and its subsidiaries during 1929 are reported by the company. This is an increase of $838,000 over 1928 when the total was $2,656,000.

Issue ATC's to More Schools

WASHINGTON (D. C.)—Additions to the list of approved type certificate schools are announced as follows: Curtiss-Wright Flying Service, 1360 Main St. (ground) Buffalo Municipal Airport (flying), Buffalo, N. Y., ground and flying, Transport, Limited Commercial, and Private; Curtiss-Wright Flying Service, Port Columbus, Columbus, Ohio, ground and flying, Transport, Limited Commercial, and Private; Lincoln Airplane and Flying School, 2415 "O" St., Lincoln, Neb., ground and flying, Transport, Limited Commercial, and Private; Yellow Cab School of Aviation, Municipal Airport, Des Moines, Iowa, ground and flying, Transport, Limited Commercial, and Private.

Sell Eight Warner Inlands

KANSAS CITY (MO.)—Inland Aviation Corp. reports the sale recently of eight sport craft powered with the new Warner five-cylinder engines.

Air Corps Maneuvers Draw Many Spectators

MATHER FIELD, SACRAMENTO (CALIF.)—Thousands of California citizens have witnessed the Army Air Corps' 1930 maneuvers which will be concluded April 27, after starting April 1. Army planes have progressively proceeded through a program of reconaissance, group training, combat demonstrations, mass aerial reviews, special radio demonstration, high altitude flight missions, and combined attacks in force on land and air targets.

Under command of Brig. Gen. William E. Gillmore, and with Maj. Gen. James E. Fechet, chief of Air Corps; F. Trubee Davison, Assistant Secretary of War; Brig. Gen. Edward King, and other high ranking officers as spectators, the various Army Air Corps units, employing giant bombardment to fast pursuit craft, have been quickly shaped into an efficient war machine.

Planes taking part in the evolutions include 22 Keystone bombers, nine tri-engined Fokker and Ford transports, 25 Douglas observation planes, and approximately 65 pursuit Boeings.

Acts as Separate Unit

The most significant phase of the 1930 maneuvers is that the Air Corps is working independently of any ground troops, seeking to develop the flying forces as a self-supporting fighting arm. Among the more spectacular work has been a demonstration of high altitude formation flying by eighteen Boeing P-12 pursuit planes of the 95 Pursuit Squadron, in command of Capt. H. M. Elmendorf, and a demonstration of ground to plane radio control by the same squadron, with Maj. Carl Spatz commanding from the ground.

An impressive and beautifully executed aerial review was staged by more than 150 planes on April 5, just four days after the exercises had started, and so perfect was the formation flying that photos taken with ordinary news cameras showed the entire 150 machines on one plate.

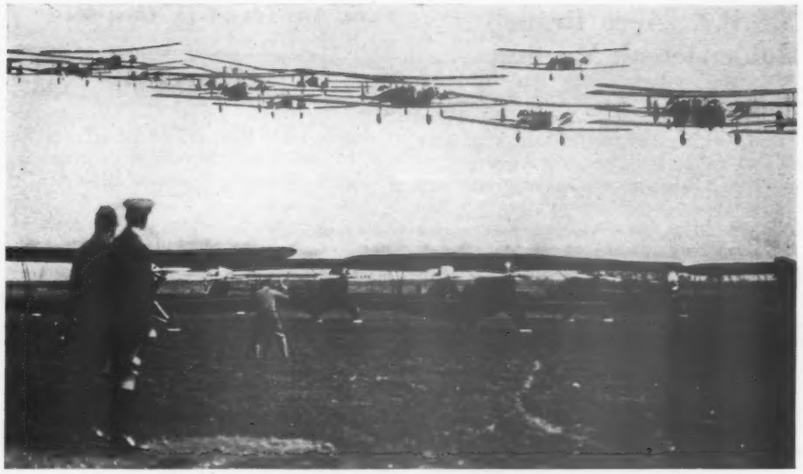
On April 7 approximately 100 planes carried out a coördinated attack on the San Francisco Bay area, the attack being directed by Lieut. Col. Frank M. Andrews, flying in an Army transport and keeping in touch with the home base and all squadron commanders by means of his radio.

Mass Review at Los Angeles

The climax of the maneuvers will come with a general attack on the San Francisco Bay district, April 19. Following this demonstration and subsequent intensive evolutions in the vicinity of Mather Field, including smoke screen laying, high altitude flying, night fighting, and mass formation flying, the entire force will fly to Los Angeles for a two-day demonstration, April 26, 27.

During their stay in Los Angeles the planes will be housed at the new United Airport, Burbank, and after April 27 they will return to their respective stations throughout the country. The Los Angeles show is to include a mass review, aerial dog fighting, smoke screen laying, strafing and attack demonstration against ground targets, and night attack work using parachute flares instead of bombs.

A significant phase of the exercises is that they have been carried on without the use of surface transportation, the entire force being supplied in every way by the army air transports, thus making this air force a truly independent arm of the military services.



Heavy Traffic! Keystone Bombers Swooping Low Over Mather Field

Gliding Regulations Discussed in Detroit

DETROIT (MICH.)—General policies of glider regulation were discussed at a meeting between W. Hawley Bowlus and other glider manufacturers, representatives of the National Glider Association, and Assistant Secretary Young of the Department of Commerce, in Detroit on April 9.

The meeting, which was called at the original suggestion of AVIATION, reached no final conclusion, but talked over the general problem of the lines on which regulation should be undertaken to give the Department of Commerce the benefit of the views of the industry and of glider enthusiasts generally prior to the drawing up of definite rules.

The consensus of the meeting was that there should be licensing of gliders by the department, with inspection of some sort, but that amateur construction and design should not be heavily penalized. Sentiment also favored a minimum of restriction on glider personnel and training.

The technical committee of the N.G.A., headed by Dr. W. Klemperer, emphasized in its report on the problem the importance of discriminating between towed flights and shock-cord launchings. Special reinforcement of the structure for the former was discussed.

"QUOTES"

Comparable? "The flight to Bermuda is less dangerous for a seaplane than the ordinary hop from New York to Cleveland is for an airplane."—CAPTAIN YANCEY and WILLIAM ALEXANDER.

Beware Ye Males! "I feel there are a lot of opportunities for women in aviation. It is my firm belief that any woman can qualify for any position in the aviation industry."—LAURA INGALLS, newly-licensed Transport Pilot.

Tweedle-Dee and Tweedle-Dum. "All this talk about battleships and tons and guns is a battle of tweedle-dum and tweedle-dee. It's air power that we must disarm. How are we going about it? I don't know."—GEORGE YOUNG, Williams College lecturer, former member British Diplomatic Service.

A Well-Deserved Compliment. "Women pilots in this country have not been without aid. Aircraft manufacturers have been more than instrumental in making possible the rapid rise of American women in the history of flight."—LOUISE THADEN, winner of womens' derby, National Air Races.

"Just Leave Us Be." "Government supervision with too much restriction will throttle the industry. What we need is supervision and control by the industry. Those actively engaged in aviation are likely to know better how to regulate it than is the government."—EDDIE RICKENBACKER, Fokker Aircraft Corp.

Form Michigan Anti-Code Group

DETROIT (MICH.)—Carrying further the complaints voiced several weeks ago by the Michigan Aircrafters' Association against the new Michigan State Air Code, Michigan operators have appointed a committee to push revision or abolition of the code. The committee was named at a meeting held during the recent All-American Show.

Kansas City Aircraft Merges With Bird Wing

ST. JOSEPH (MO.)—Consolidation of the Kansas City (Kan.) Aircraft Co., Fairfax Airport, with the Bird Wing Commercial Aircraft Co., Mid-America Airport, this city, has been approved by stockholders of both companies, and officers of the new resulting firm, to be known as the Bird Wing Co., will be elected shortly, it is announced.

The deal, which is said to involve more than $500,000, also includes the Mid-American Flying Service, a Bird Wing subsidiary which handled the sales, promotion, and school activities.

Manufacturing operations will be continued in both Kansas City and St. Joseph for the time being, but eventually it is planned to locate the plants in only one of the two cities.

A general expansion policy will be adopted by the new concern. Capitalization of the firm will be increased to approximately $500,000, and sales and service divisions will be enlarged.

Diesel Stinson in New ATC Group

WASHINGTON (D.C.)—Three approved type certificates for planes and one for an engine have been issued by the Department of Commerce recently. The planes so classed are as follows, according to certificate number, make and designation, type, power plant, weight empty, useful load, and gross weight: No. 310-Spartan C-4-225, four-place closed monoplane, Wright J6-7, 2,325 lb., 1,190 lb., 3,515 lb.; No. 311—Waco Model RNF, three-place open biplane, Warner 1,130 lb., 675 lb., 1,805 lb.; No. 312—Stinson SM-8D, four-place closed monoplane, 225 hp. Packard Diesel R980, 2,175 lb., 1,025 lb., 3,200 lb. LeBlond Aircraft Engine Corp. was awarded engine certificate No. 46 for its model "66" R-265, a five-cylinder, radial, air-cooled power plant, developing 85 hp., at 2,125 r.p.m.

Airships, Inc., Is Bankrupt

BUFFALO (N. Y.)—An involuntary petition in bankruptcy has been filed in United States District court at Buffalo against Airships, Inc., of Hammondsport, N. Y., by Gibbons & Pottle, Buffalo attorneys, with claims of the Goodyear Tire & Rubber Co., Akron, Ohio, $12,073; Goodyear-Zeppelin Corp., Akron, Ohio, $528 and Beals, McCarthy & Rogers, Inc., of Buffalo, $1,006. No application was made for the appointment of receivers and no estimate made of assets or liabilities.

Produce Lambert Monocoach

MOLINE (ILL.)—Line production of the 1930 Lambert-powered Monocoach has been begun here by the Mono Aircraft Corp., according to Don A. Luscombe, president. The Monosport model, it is stated, will be discontinued shortly because many of its features have been incorporated in the new plane.

Buy Six Buhls for New Airline

DETROIT (MICH.)—A 2,400-mi. airline soon to be opened between St. Paul, Minn., and Spokane, Wash., will start operations with six Airsedans recently purchased from the Buhl Aircraft Co., Marysville, Mich., by N. B. Mamer, vice-president of the company in charge of the new air route.

Harvard Flying Club Wins Loening Award

WASHINGTON (D. C.)—First prize of $1,000 in the Grover Loening Intercollegiate Flying Contest has been awarded to the Harvard Flying Club, it is announced by the Contest Committee of the National Aeronautic Association. A trophy, to be held until awarded again, will also go to the Harvard group.

Seven flying organizations from leading colleges entered the competition; of these, the University of Detroit Aeronautical Society won the second prize of $500, Yale Aeronautical Society, third prize of $300; and the New York University Flying Club, fourth prize of $200.

The principal factor in the award of prizes was actual time spent in flying by the members. Gliding activities, safety records, writing of papers, and ground school work, were the other bases of judgment.

The Harvard Flying Club is called "the oldest college flying organization in the country," and it is the only one to own its own plane outright. It is composed of 22 licensed pilots, who amassed a total of 1,155 hr. of flying during the contest period.

The trophy and the prizes are to be presented to representatives of the winning organizations at a dinner given by Grover Loening in New York, April 19.

Midwest Increases Capital

MILWAUKEE (WIS.)—Midwest Airways, Inc., has increased its capital stock from $12,000 to $100,000. A new brick hangar, to cost about $25,000, is to be erected by the firm, which operates a flying school and passenger taxi service. The company has been designated as a factory branch of the Detroit Aircraft Corp. and will handle that organization's planes exclusively. A service station will be maintained for D.A.C. craft and for Wright and Kinner engines.

Plan Five Stinson Branch Plants

WAYNE (MICH.)—Arrangements are being made by the Cord Corporation, with which Stinson Aircraft Corp. is affiliated, to open five Stinson branch factories throughout the country. Negotiations are now being made to purchase a large site in Chicago for one of the plants while the others will be located in Los Angeles, Tulsa, New York, and either Atlanta or Tampa.

Air Navigation Control Being Contested in Canada

OTTAWA (ONT.)—The control of air navigation, as between the federal and provincial governments has come before the Supreme Court of Canada as the first step in an endeavor of the Dominion to have air navigation placed under federal control.

The reference to the Supreme Court took the form of the submission of four questions, which, if answered in the affirmative, would place the absolute control of aeronautics in the federal parliament. The questions were:

1. Have the Parliament and government of Canada exclusive legislative and executive authority for performing the obligations of Canada or of any province thereof, under the articles entitled "Convention relating to the regulation of aerial navigation?"

2. Is legislation of the Parliament of Canada providing for the regulation and control of aeronautics generally in Canada, including flying operations carried on entirely within the limits of a province, necessary or proper for performing the obligations of Canada, or of any province thereof?

3. Has Parliament legislative authority to enact, in whole or in part, the provisions of Section 4 of the Aeronautics Act, Chapter 3?

4. Has Parliament legislative authority to sanction the making and enforcement, in whole or in part, of stipulations contained in the Air Regulations, 1920, respecting: The granting of certificates or licenses authorizing persons to act as pilots, navigators, engineers, or inspectors of aircraft; regulation, identification, inspection, certification, and licensing of aircraft; inspection, regulation, and licensing of airports and air stations?

Lawyers on behalf of the Dominion pointed out that aviation corresponds to railways and shipping, and therefore its control would fall under the Dominion government. It was also pointed out that Canadian air mail routes, stretching as they do from one province to another, should not be under separate regulations but under Federal control, the same regulations applying in all provinces.

Roosevelt Signs Insurance Bills

ALBANY (N. Y.)—Governor Roosevelt has signed the Wheatley bill as Chapter 391, laws of 1930, amending Section 110 of the insurance law, in relation to incorporation of companies by providing that companies may be incorporated to insure against the breaking of glass in airplanes, seaplanes, and dirigibles. The governor also signed the Cornaire bill which became Chapter 396, laws of 1930, amending subdivision 9, Section 70, insurance law, in relation to loss of or damage to property by falling aircraft by providing that such insurance may also be made against loss of or damage to property resulting from the maintenance and use of aircraft.

AERONAUTICAL FINANCE

By R. R. Doane

COMPARATIVE CONSOLIDATED BALANCE SHEET
(Condensed)
CURTISS-WRIGHT CORPORATION

Assets	June 30, 1929	Dec. 31, 1929	Net Change
Current assets:			
Cash and call loans	26,460,891.17	8,999,155.82	—17,461,735.35
Marketable securities	516,444.29	46,961.75	— 469,482.54
Accounts and notes receivable	2,445,373.41	2,661,732.92	+ 216,359.51
Inventories	10,416,438.85	12,796,038.52	+ 2,379,599.67
Deposits, advance payments	527,910.05	203,562.67	— 324,347.38
Cost uncompleted contracts	1,766,504.02	.....	.....
Due from bankers[1]	.....	2,042,490.00	.....
Total current assets	42,133,561.79	26,749,941.68	—15,384,620.11
Capital Assets:			
Land, factory sites	1,217,395.52	1,259,648.86	— 42,253.34
Land, airport sites	7,621,048.37	15,615,823.68	+ 7,994,775.31
Factory, buildings, machine equipment	18,242,668.44	19,948,737.12	+ 1,706,068.68
Airport construction and equipment	1,129,441.65	8,985,872.19	+ 7,856,430.54
Aircraft operating equipment	131,801.31	3,278,864.10	+ 3,147,062.79
Total capital assets	28,342,355.29	49,088,945.95	+20,746,590.66
Less depreciation	2,081,673.19	3,179,125.87	— 1,097,452.68
Net capital assets	26,260,682.10	45,909,820.08	+19,649,137.98
Miscellaneous investments	3,066,673.89	2,304,463.36	— 762,210.53
Patents, patent rights net	4,745,001.84	1,920,809.52	— 2,824,192.32
Leaseholds, prepaid insurance expenditures allocated to future production	1,386,897.14	1,587,889.55	+ 200,992.41
Good will	.....	1.00	.....
Miscellaneous items	4,784,674.62	.....	— 4,784,674.62
Total assets	82,377,491.38	78,472,925.19	— 3,904,566.19

[1]Collected since Jan. 1, 1930.

Liabilities	June 30, 1929	Dec. 31, 1929	Net Change
Current Liabilities:			
Notes payable	600,000.00	4,825,000.00	+ 4,225,000.00
Accounts payable	1,961,479.28	2,886,815.28	+ 925,336.00
Provision for Federal Tax	330,984.36	160,600.81	— 170,383.55
Accrued wages, interest, etc.	.....	326,505.03	+ 326,505.03
Deposits on unfilled sales contracts	1,592,363.24	478,078.04	— 1,114,285.20
Bond and mortgages due 1930	.....	416,663.75	+ 416,663.75
Total current liabilities	4,484,826.88	9,093,662.91	+ 4,609,836.03
Bonds and mortgages due subsequent to 1930	.....	1,389,381.11	+ 1,389,381.11
		10,483,044.02	
Equity of minority stockholders in subsidiaries' capital stock	.....	6,696,327.28	+ 6,696,327.28
Miscellaneous items and reserves	1,814,710.69	.....	— 1,814,710.69
Total capital stock and surplus	76,077,953.81	61,293,553.89	—14,784,399.92
Total liabilities	82,377,491.38	78,472,925.19	— 3,904,566.19
Net working capital	37,688,732.91	17,656,278.77	—20,032,454.14

THE PUBLICATION of the first annual report of the Curtiss-Wright Corporation constitutes, in many respects, a remarkably interesting financial document.

Aside from its chief interest as the first statement of one of the world's premier aircraft corporations the outstanding element is the severity with which this company has written off practically all of its development and deferred charges, as well as effecting other quite drastic changes, in a relatively short period of time. As much of these charges are non-recurring it is evident that this company has eliminated a huge slice of grief at the outset, which is certainly sound financial policy, the wisdom of which should bear evidence in forthcoming statements.

For purposes of accurate interpretation this report is here compared, in condensed form, with the consolidated totals as of June 30, 1929 as officially filed with the Committee on Stock List of the New York Stock Exchange.

Many who are not intimately acquainted with a given type of business are frequently called upon to form tentative judgments as to the financial efficiency of an enterprise based entirely upon statements of account as furnished by the corporation itself. The process of interpreting these more or less fragmentary reports is not an easy one even to the expert. Thus in making an analysis, or *reconstruction,* from such reports it is helpful to be guided by comparison with previous statements in order that the major changes may be noted quickly. Further a table of ratios may prove advantageous (such as employed by bankers) in determining the internal condition of a company.

The accompanying comparative ratio summary graphically discloses the significance of the major changes in the corporation's position. It will be noted that many of these changes have been drastic as they quite naturally would be during the rapid reconstruction of this organization into a more effective working unit.

The notable changes in the corporation's cash and net working capital position, though apparently severe, obviously reflects a desire to put these assets more effectively to work than heretofore, as the previous position in this regard was largely out of proportion to necessary requirements.

The outstanding deduction of approximately two and one half million dollars from current income for capital expenditure, in many respects, is analogous to the so-called hidden reserves, or hidden profits, not altogether unknown in American industrial finance. Sooner or later some group of shareholders will benefit in large measure by such procedure although it may be difficult for many of the present stockholders to swallow the pill.

It will be observed that sales increased almost 100 per cent, and other income increased 11 per cent over this six months period. It will also be noted that fixed assets have sharply increased, as well as inventory, while the percentage of gross sales to total capital investment has increased 23 per cent. These are unquestionably favorable factors, although the net profit on sales discloses a slight reduction.

The operating ratio has also shown a slight increase from 93.9 to 97.4, an unfavorable factor under normal conditions, as a high operating ratio means

COMPARATIVE RATIO SUMMARY
CURTISS-WRIGHT CORPORATION FINANCIAL POSITION

	June 30, 1929	Dec. 31, 1929
Cash position (Current assets, minus inventory divided by current liabilities.)	7 to 1	1½ to 1
Quick position (Current assets including inventory, divided by current liabilities.)	9.3 to 1	2.9 to 1
Inventory position (Inventory divided by current assets.)	24.7	47.8
Utilisation of plant (Cost of product divided by plant and building accouht.)	39.8	41.7
Fixed assets position (Plant and permanent investments divided by capital and surplus.)	34.5	74.8
Operating ratio (Percentage of total expense to gross sales.)	93.9*	97.4†
Percentage of gross sales to total capital and surplus	19.4	42.4
Relation of other income to total income	56.4	67.0
Percentage administration cost to gross income	13.8	17.2

*Covering the six months period.
†Covering the one year period.

CURTISS-WRIGHT CORPORATION
COMPARATIVE CONSOLIDATED INCOME ACCOUNT

	June 30, 1929	Dec. 31, 1929
Sales (including operating revenue to June 30)	14,766,859.60	26,047,904.08
Cost of sales, including depreciation of manufacturing facilities	11,295,444.13	20,453,193.07
Gross profit	3,471,415.47	5,594,711.01
Administrative, selling and general expenses	2,039,566.42	4,481,705.63
Net profit from operations	1,431,849.05	1,113,005.38
Other income[1]	1,855,200.48	2,375,336.43
Total gross income	3,287,049.53	3,488,341.81
Other deductions	188,930.24	281,881.57
Net income	3,098,119.29	3,206,460.24
Provision for Federal Taxes	357,793.84	160,600.81
Net income after provision for taxes	2,740,325.45	3,045,859.43
Dividends paid on account of 1928	624,216.88	.....
Extraordinary development expense, inventory adjustments	.....	1,421,268.14
Net profit manufacturing, subsidiaries	.....	1,624,591.29
Cost of establishing airports and flying services	.....	2,471.013.63
Net loss for year	.....	846,422.34
Portion applicable to minority stockholders	.....	177,890.30
Net loss applicable to Curtiss-Wright Corp. stockholders	.....	668,532.04

[1]Includes interest on call loans, bank deposits, profit on sale of miscellaneous securities.

that even a slight variation in expenses may be sufficient to transform a profit into a loss. An operating ratio as high as 97 per cent is a dangerously close margin under any circumstance. Especially is this true in a field where the demand has not yet attained any high degree of stability. This may also be due to a temporary state of over-competition within the industry.

Another item of considerable importance that should not be overlooked in the income account is the sale of miscellaneous securities previously held by the corporation. This is included in "other income" and amounted to a total of $1,619,783.85. In other words 46.4 per cent of the total disclosed income during this period was from the sale of assets.

Unusually large expenditures were met in the company's experimental and research departments. Further, the character of new development has been such as to come only slowly into effective income producing operation during the brief period of six months. Also, in the closing months of the year, commercial sales were sharply curtailed as the natural result of the world wide decline in general business activity. Notwithstanding these difficulties it is reported from authoritative sources close to the company that firm orders on the books, as of March 31, 1930, are in excess of $17,000,000, thus reflecting a substantial improvement over the previous quarter.

Kinner Assets Total $825,000

GLENDALE (CALIF.) — The annual financial statement of Kinner Airplane & Motor Corp., as of March 1, 1930, shows the company to have current assets amounting to $825,000 and current liabilities of but $79,000, or a ratio of current assets to current liabilities of better than ten to one. The company reports $160,000 cash on hand and C.O.D.'s in transit of approximately $60,000. With more orders on hand than at any other time in its history the company has ample working capital to meet all production demands anticipated during 1930 and no plans for additional financing are contemplated at this time.

I-E Firm Interests Sold

SPOKANE (WASH.) — Frank Funkhouser, president of the Inland Eaglerock Co., aircraft distributor for the last four years, has sold his interests to L. L. Bruning, Colfax business man. Mr. Bruning will continue operation of the firm, which has the northwest distributorship for Eaglerocks.

Sell Eight Stinsons in New York

NEW YORK (N. Y.)—Eight Stinson Juniors were sold recently by the C. T. Stork Corp., Stinson Aircraft Corp. distributor, for a total of $54,640. Among the sales was the Diesel-powered Junior, priced at $8,995, which was exhibited at the Detroit All-American Show. This plane was purchased by B. F. Schulte Optical Co., this city. Six of the other craft were Lycoming-powered while the seventh had a Wasp Junior power plant.

Chamberlin Starts School Chain

JERSEY CITY (N. J.)—Clarence D. Chamberlin, president of the Crescent Aircraft Corp., has opened a flying school at Norfolk, Va., and is making plans to open one at Moorestown, N. J., as part of a nation-wide chain of schools he will establish. Ground instruction at the Norfolk base will be presided over by United States Navy instructors from Hampton Roads, while Moorestown students will receive part of their training at the Crescent plane factory and the Jersey City Airport.

Fund Issues Report On Blind Flying Tests

NEW YORK (N. Y.)—According to a pamphlet issued by the Daniel Guggenheim Fund for the promotion of Aeronautics on Lieut. James H. Doolittle's fog flying experiments, a pilot not able to fly by instruments alone has not yet finished his training.

The booklet contains information and details concerning Lieutenant Doolittle's blind flying experiments for the Fund concluded last Autumn, while suggestions are given for future development along the same line, especially with the idea that the principles may be applied to commercial airways.

"Reference has been made to Lieutenant Doolittle's flight as a stunt and one not readily emulated by a pilot with less training," the report says. "Admittedly, fog landing at this stage is something of a stunt, but it can be done by any pilot of average ability with a few hours' practice. It is necessary only that he should have complete reliance on his instruments and the ability to use them."

"It may appear that the instruments are too complicated and that too much experience is required for their operation. This is not the case, as was actually shown by the Fund's pilot at Mitchel Field. It had been remarked that much of the work done by the fog flying laboratory could be accomplished only by an expert pilot.

Equipment Described in Detail

"Critics promptly responded that a second lieutenant was continually flying and was an expert pilot. Thereupon, the Fund's pilot, after a very short indoctrinization course, accomplished the same experiment with a high ranking officer of the Army Air Corps,—one who was not as active in flying as the lower commissioned personnel. The conclusions are obvious."

The booklet describes in detail the equipment used by Lieutenant Doolittle on Sept. 24, at Roosevelt Field, L. I., N. Y., when he took off and landed his airplane by instruments alone. He flew a total distance of about twenty miles and landed at almost exactly the same spot from which he had taken off 15 min. earlier, although the cockpit of his plane was completely covered over.

"This flight is in no sense considered the final solution of the problem of fog flying, but did prove conclusively that an airplane carrying the necessary instruments can land safely on a properly prepared airport, regardless of weather conditions."

The report discusses in detail the proper arrangement of instruments in the cockpit to insure the maximum efficiency.

New Davis Model in Production

RICHMOND (IND.)—A new Davis D-1 monoplane has been placed in production by the Davis Aircraft Corp. Engine, LeBlond "66"; price $3,585.

PERSONNEL

MILTON C. BAUMAN, formerly with the Dayton-Wright Co., and designer of one of the United States entries in the 1920 Gordon Bennett Cup Races, has been placed in charge of design and engineering for Inland Aviation Co., Fairfax Airport, Kansas City, Kan.

ARTHUR W. SOWDON, formerly director of sales for Detroit Steel Products Corp., has been made vice-president and traveling consultant for Airport Development & Construction Co., Philadelphia, Pa. He will spend much of his time touring the country by plane.

A. W. Sowdon

HOWARD M. SHAFER has been appointed manager of Rochester (N. Y.) Airport, with IRA A. KUEBL as assistant manager.

A. E. MONTEITH has been made president of Associated Aircraft, Inc., Los Angeles, Calif., succeeding PAUL L. BURKHARD, resigned.

H. V. ALMEN, formerly with General Motors Research Laboratories, has been appointed research engineer at Kinner Airplane & Motor Corp., Glendale, Calif.

C. S. BRAGG and A. L. HUMPHREY have been elected directors of Bendix Aviation Corp., succeeding C. M. KEYS and J. C. WILSON, resigned. In a statement at the annual meeting, VINCENT BENDIX, president, said that the company would soon form two new subsidiaries in the aviation field.

CHARLES DOHERTY, specialist in aerial photography, has joined the aviation department of Edwin Levick, Inc., New York, N. Y., photographic service.

W. E. SCHAEFER, formerly with Stout Metal Airplane Co., and associated with the building of the "Shenandoah," has been made chief engineer of Detroit Aeronautic Products Co., and will make his headquarters at the factory in Detroit.

HOWARD WEANT has been made field manager for Eastern Air Transport at Charlotte, N. C., municipal airport.

FRANK J. COONEY, recently with Rodney E. Boone Co., has joined the sales staff of Visugraphic Pictures, Inc., New York, N. Y.

M. H. ST. CLAIR, formerly parachute engineer of the Engineering Division of the U. S. Army Air Corps at Wright Field, Dayton, Ohio, has joined the technical staff of Switlik Parachute & Equipment Co., Trenton, N. J.

W. LIVINGSTON HOPKINS has been appointed sales manager for Curtiss-Wright Flying Service at Bridgeport, Conn.

MISS LORRAINE DEFREN has resigned as publicity representative of Skyways, Inc., Boston, Mass., and will devote herself to promotion activities in the aviation field.

THEODORE C. JEWETT has been elected chairman of the Buffalo (N. Y.) airport advisory board. Other members are JOSEPH H. DOTTERWEICH, THOMAS W. PATERSON, WILLIAM T. JEBB, THEODORE C. KNIGHT.

MAJ. H. A. MALONEY has been named superintendent of the Jacksonville (Fla.) municipal airport, succeeding J. W. GRIFFIS, resigned.

GERARD VULTEE, chief engineer of Lockheed Aircraft Co., has been promoted to the position of project engineer for Detroit Aircraft Corp., with headquarters in Detroit. RICHARD VON HAKE has been promoted to the position of chief engineer for the Lockheed company.

G. W. Lossow, Department of Commerce inspector at Wichita, Kan., has been transferred to Los Angeles.

J. HALL MCKENNEY has been named general manager of Braley School of Flying, Wichita, Kan., which is now being reorganized under the direction of a receiver. Court permission to borrow $10,000 and effect a complete re-alignment has been received.

ERNEST J. BERNS, formerly chief flight instructor for Furniture Capital Air Service, Grand Rapids, Mich., has been appointed chief test pilot and airport manager for Szekely Aircraft & Engine Co., Holland, Mich.

JOHN J. DONELLAN, JR., former Canadian representative of Niles Airways, has been made director of student activities at Midwest Airways' Flying School, Milwaukee, Wis.

LEE GARNER has been made manager of Big Springs (Tex.) airport, suceeding CHARLES SMOOT.

CLARENCE CHAMBERLIN has been engaged by the City of Philadelphia as consultant in connection with the development of Hog Island as an airport, following purchase of the island from the U. S. Shipping Board for $3,000,000.

C. D. Chamberlin

LAMAR M. THOMAS, former aerial photographer for the Air Corps, has been placed in charge of aerial photography for Curtiss-Wright Flying Service at Memphis, Tenn.

FRED T. MCGLYNN, chief pilot for Curtiss-Wright Flying Service at Syracuse, N. Y., has resigned to become test pilot for General Electric Co., Schenectady.

MRS. ORRA HEALD BLACKMORE, Detroit, Mich., has been re-elected president of Women's National Aeronautical Association. Other officers elected were: MRS. GEORGE SHAW GREEN, Dayton, Ohio, first vice-president; MRS. CLARK D. STEARNS, Miami, Fla., second vice-president; MRS. SYDNEY A. ERWIN, Detroit, treasurer; MISS RENA B. SCHLEE, Detroit, secretary.

AERONAUTICAL CALENDAR

May 27-30	All-New England Air Tour, starting from Springfield Airport, Springfield, Mass.
June 28	Annual R.A.F. Display, Hendon, Eng.
July 20-Aug. 7	International Light Plane Tour, starting from Tempelhof Airport, Berlin, Germany.
Aug. 23-Sept. 1	National Air Races, Chicago, Ill.

EXPOSITIONS

April 18-26	Tri-State, Aircraft Show, Convention Hall, Camden, N. J. L. D. Odhner, executive secretary, Hotel Walt Whitman Annex.
April 19-26	Aircraft Exhibition under auspices of Montreal Light Aeroplane Club, at The Stadium, Montreal, Canada.
May 3-10	New York Aircraft Salon, auspices Metropolitan New York Division, Distributor-Dealers Section, Aeronautical Chamber of Commerce, at Madison Square Garden, New York City.
June 2-7	Northwest Aircraft Exposition, the Coliseum, Minneapolis-St. Paul, Minn. Show Director, Ray Krimm, 601 Wesley Temple Bldg., Minneapolis.
June 28-July 6	Pacific Coast Aeronautical Exposition, Oakland, Calif., Municipal Airport.
July 6	International Transportation Exposition, Warsaw, Poland.
Sept. 6-8	International Aero Exhibition, Stockholm, Sweden.

MEETINGS AND CONFERENCES

May 5	A.S.M.E. conference on economy of maintenance and operation, New York, N.Y.; Fiftieth Anniversary Meeting.
May 14-16	National Conference, Airport Section, Aeronautical Chamber of Commerce, Buffalo, N. Y.
May 19-22	Fourth Annual Technical Aeronautics Meeting, A.S.M.E., Wright Field, Dayton, Ohio.
June 9-12	Semi-annual meeting, A.S.M.E. Detroit, Mich.
July 3-5	Western States Aeronautical Conference, Medford, Ore.
Sept. 1-6	Fifth International Air Congress, under the auspices of the Royal Aero Club; The Hague, Holland.

AIRPORT DEDICATIONS

April 19	New Bedford-Fairhaven Airport, dedication and meet, New Bedford, Mass
April 19-25	Columbia, S. C., Municipal Airport.
April 21-22	Ware County Airport, Waycross, Ga.
May 27	Turners Falls-Greenfield, Mass.
May 30-June 1	Dedication and Air Circus, Colusa, Calif., Municipal Airport.
May 30-June 1	Dedication and Air Meet, Bowles Airport, Springfield, Mass.
May 29-31	Abilene, Tex., Municipal Airport.
June 20-21	Randolph Field, San Antonio, Tex.

BRIEFLY

Lieut. Apollo Soucek is actively preparing for another attempt to capture the World's altitude record. His Wright Apache biplane has been equipped with a new engine and wing coverings. Lieutenant Soucek will return to duty with the Fleet in two months.

There will be two days of air races at Columbia, S. C., with prizes aggregating $2,575, April 24-25.

Buffalo-Springfield Roller Co., which has a Curtiss Robin plane for company use, is planning to develop special rollers for use on airports.

Exploration operations of Northern Aerial Mineral Exploration Co., of Canada, have begun for the current season with five planes operating from the Pas.

Maj. J. Carroll Cone, sales manager of American Eagle Aircraft Corp., is touring central western states in the interests of the company, and Joe Young, salesman, is on a flying tour through the South. American Eagle Model 201 planes are now being adapted for use with Brownback and American Cirrus engines.

Between Jan. 15 and March 15 the number of pilots holding Department of Commerce licenses increased by 753, and the number of mechanics by 206; but the number of planes holding active licenses showed a decrease from 6,784 to 6,465.

During the Air Corps maneuvers at Mather Field, Sacramento, Calif., a combat formation of nineteen planes reached an altitude estimated at 30,000 ft. Previous record for a formation was 17,000 ft. Capt. H. M. Elmendorf was in command.

Chevolair Motors, Inc., builder of air-cooled inverted aircraft engines, is offering an additional issue of 25,000 shares of no par value common stock.

Two carloads of Stinson planes have been received by the newly established factory branch at United Airport, Burbank, Calif. Bruce Braun is in charge.

Headquarters office of Curtiss-Wright Flying Service of Calif., at Los Angeles, has been transferred to Grand Central Air Terminal, Glendale, in the new administration building. Flying school activities, however, will continue to be centered at Los Angeles airport.

H. Roscoe Brinton and Lowell Bayles have purchased the interests of Ross G. Owen in Berkshire Aero Service, Pittsfield, Mass.

Roosevelt Aviation School, L. I., N. Y., has taken delivery of an Aeronca C-2 plane. It was flown non-stop from Cincinnati, Ohio, to Plainfield, N. J., in 9 hr. 15 min.

A Naval Reserve Inspection Board, headed by Capt. C. A. Blakely, will inspect reserve units in the Middle West and West, between April 22 and May 7.

A bill requiring Federal licenses for pilots and aircraft operating in New Jersey, together with provisions for state control of aviation, has been introduced in the state legislature.

Red Wing Flying Service, Ware, Mass., is offering plane rides at $1 per adult, and 50 cents for children. The company uses three New Standard planes with Wright engines.

Increased production of the "Rambler," which recently qualified for an international airworthiness certificate at Montreal, is planned for the immediate future. It is fitted with Gipsy engine and Handley Page slots. Six were recently delivered to the Canadian Government for Army use at Camp Borden.

A Ford 5-AT plane with three Wasp engines is making a six months' tour of Japan and China with Perry G. Hutton as pilot.

New York-New Jersey Endurance Flight, Inc., Suneagles Country Club Airport, Eatontown, N. J., is planning an endurance record attempt in which pilots as well as fuel will be replaced during the flight. Refueling by ground pick-up as well as hose is planned.

Boeing Aircraft of Canada, Ltd., Vancouver, B. C., is constructing five 40-B-4 mail planes for Western Canada Airways.

On the order of the American Red Cross, 283 lb. of vaccine were recently sent to Costa Rica by plane to relieve a smallpox epidemic.

Varney Air Service is seeking a location for gliding activities. Bowlus gliders are used in preliminary tests.

F. Trubee Davison, Assistant Secretary of War for Aeronautics, has accepted delivery of a Consolidated Fleetster which he is using on a tour of U. S. Army air fields. Capt. Ira Eaker is piloting the plane.

The Army Air Corps ordered 130,000 gal. of gasoline and 5,000 gal. of oil from Richfield Oil Co. of California, to be delivered to Mather Field, Sacramento, Calif.

Members of the Women's Prop and Wing Club, Boston, will undertake a cross-country flight from Boston to Portland, Me., April 26.

Lenert Aircraft Corp., Pentwater, Mich., has increased its capital stock from $50,000 to $100,000.

New Firms Announced

ALAMOSA FLYING SERVICE, INC., Alamosa, Colo.; capitalization, $50,000; by W. D. Sheeley, Bert E. Fallon, Samuel L. Nunnelly.

YANKEE FLYERS, INC., New York City; capital, $15,000; Earle Walton, E. D. Baker, and H. L. McGee, directors and subscribers; George McElroy, 741 Linden Ave., Elizabeth, N. J., attorney; to deal in aircraft of all kinds.

YORK FLYING SERVICE, INC., York, Pa.; capitalization, $25,000; A. L. Millard, pres., A. R. Ruth, vice-pres., Lester J. Sipe, treas., Roman J. Smyser, sec'y.; to buy, sell, and operate airplanes.

SCHOOLS

UNIVERSITY OF BUFFALO, Buffalo, N. Y., has opened a ground school course under the direction of Prof. Harold W. Taylor.

CONSOLIDATED MINING & SMELTING CO. OF CANADA has moved its aviation school from near Creston to Kalso, B. C. Twelve employees of the company are taking instruction.

CURTISS-WRIGHT FLYING SERVICE has announced plans to establish a complete flying school to supplement its present crop-dusting activities in the San Joaquin Valley. Visalia Airport has been chosen as the initial base of operations, but the decision as to a permanent location is being left open at present. Classes will be opened in any neighboring city where five students can be gathered.

MCMULLEN SCHOOL OF AVIATION, Tampa, Fla., is offering a new course for business men consisting of eight lectures and two flights in a cabin plane with a pilot explaining all air maneuvers as they are executed.

NATIONAL AIRCRAFT WELDING SCHOOL, Kansas City, Mo., has added new electric welding equipment for teaching purposes.

VON HOFFMANN AIRCRAFT SCHOOL, St. Louis, has increased the regular mechanics' course two weeks in duration in order to allow time for training on generators and electric starters.

BOEING SCHOOL OF AERONAUTICS, Oakland, has leased a 480-acre tract in southern Alameda Co. for gliding instruction purposes. Seventy students are now receiving glider training.

CURTISS-WRIGHT FLYING SCHOOL, Los Angeles, will shortly offer glider training, at a slight additional cost, to all its regular flying students.

JACKSONVILLE GLIDER SCHOOL was organized recently with an opening enrollment of more than 50 students.

SPARTAN SCHOOL OF AERONAUTICS, Tulsa, Okla., is having a two-reel, natural color motion picture made, depicting the life of a student throughout a complete flying course. The film, to be entitled "The Dawn Patrol," will be shown to groups of prospective students.

AIRTECH SCHOOL OF AVIATION, San Diego, Calif., recently conducted the first of a series of cross-country flights for advanced transport students. Four planes, each piloted by a student, flew in close formation from San Diego to Phoenix and back again.

ARROW AIRCRAFT & MOTORS CORP., Havelock, Neb., offers instruction on a pay-as-you-fly plan.

DETROIT GLIDER SCHOOL offers ground instruction as well as glider flight training.

MIDWESTERN SCHOOL OF GLIDING, St. Joseph, Mich., will operate a summer gliding camp.

LEONARD MOTORLESS AIRCRAFT CO., Grand Rapids, Mich., offers a course in glider flying for $50.

AIRPORTS AND AIRLINES

N.A.T. and United Continue Controversy

NEW YORK (N.Y.)—The struggle between National Air Transport and United Aircraft & Transport Corp. reached what might be called its fourth phase on Monday, April 14, when the latter secured a restraining order through a Wilmington (Del.) official to prevent N.A.T. from carrying out a plan to exchange stock with Eastern Air Transport, subsidiary of North American Aviation, on a basis which would give N.A.T. the complete ownership of Eastern.

This action by United was taken to maintain a status quo, United representatives said, so that the financial situation obtaining at the time of the annual meeting of N.A.T. on April 10 would continue. This would preserve the situation existing then, it was said, so United could carry out its threat to protest through court action the events involved in the N.A.T. annual meeting. At that meeting United was quite completely blocked from its plan to secure control or at least formidable influence in N.A.T. through the exercise of proxies it had secured. A bill contesting the legality of the annual meeting was to be filed April 16.

Stages of Controversy

The three phases leading up to the latest action taken, as AVIATION goes to press, were as follows:

1. United made offers to N.A.T. for a financial and operating agreement merging the interests of the two groups although maintaining the identity of N.A.T. This offer was refused flatly by the N.A.T. directors.

2. United at once sought to acquire all the N.A.T. stock it could directly from the stockholders. This was done through the mail and through newspaper advertisements. The purpose was to secure as many voting proxies as possible so that United would have a voice in the N.A.T. annual meeting.

3. At the annual meeting two United representatives appeared and their voting played no part in the outcome. It was alleged immediately after the meeting, however, that the N.A.T. directors had held a special meeting a few days before the annual meeting and had changed the by-laws so that one-third of the directors constituted a quorum instead of one-half and provided that a vote of three quarters of the stockholders would be necessary to remove a director. United declared it would contest the meeting on the ground of illegality and secured the restraining order as stated above. United alleges also that N.A.T.

(*Concluded on Page* 829)

Denver Gets A-1-A Rating

WASHINGTON (D. C.)—The second airport rating issued by the Aeronautics Branch has been granted the Denver Municipal Airport. It is the A-1-A recognition, the same that was awarded to the Pontiac (Mich.) Municipal Airport on February 11.

P.A.A. Plans New Route Over Caribbean

NEW YORK (N. Y.)—Pan American Airways has announced plans for a new route between this country and the Canal Zone for its mail planes, the new itinerary to go into effect April 26 with the inauguration of its proposed seven-day service between New York and Buenos Aires and Montevideo. Practically a direct flight across the Caribbean will be made instead of a swing through Central American countries between Belize, British Honduras, and the Canal Zone, as in the past. Under the new plan the planes will be flown 600 mi. across the Caribbean from Havana to Cape Gracias a Dios, on the northeastern coast of Nicaragua, and thence across 400 more miles of sea to France Field. This flight will be made between 6 a.m. and 6 p.m.

Inauguration of such a straight-line route has been under consideration for some time and has been mentioned in connection with the proposed use of the Sikorsky S-40 four-engined amphibion now in the process of development at Bridgeport, Conn. Two whole days will be saved over the present route. Practically the same schedule for the seven-day service will be in effect as announced in the April 12 issue of AVIATION. The first plane will take off from Miami on April 26 and the mail is expected to reach Buenos Aires on May 2.

One Stop En Route

The planes will make but one stop between Havana and Cristobal (France Field). For this stop a field at Tuapi Lagoon, about 50 mi. south of Cape Gracias a Dios will be used. This field was started by the Bragman-Buff Lumber Co. for its own use and was developed by the Marine Corps, which installed a hangar. Pan American has installed a fueling system. The Sikorsky S-38 will be used.

In connection with the launching of this service, Pan American in co-operation with other air mail operators throughout the country and city officials has launched a campaign to observe April 25 as Latin American-United States Air Mail Day. This is the day on which mail from distant sections of the country should be mailed to be included in the first flight.

Hog Island Tract Sold To Phila. For Airport

PHILADELPHIA (PA.)—This city has acquired from the United States Shipping Board the Hog Island shipyard site for the development of a huge air-rail-marine terminal, a project which has been under consideration for some time. As AVIATION goes to press only the formal ratification of the deal is required and no hitch was expected there. The sale price was $3,000,000, with $450,000 down. For the first 10 years the city may pay, instead of cash, a ground rental of $76,500 and after that period $153,000 a year until the land is paid for. The sale agreement stipulates that $500,000 must be spent at once on grading of the site selected for the airport and seaplane base.

An exhaustive survey of all possible sites in the Philadelphia area was made by R. Harland Horton, aviation advisor to Mayor Harry A. Mackey, with the aid of Robert E. Lenton and associates, of the Airport Development & Construction Co., of this city, and Alexander Murdoch, director of public works. The plans necessitated consideration of the marine and rail facilities first, because of the Shipping Board's attitude toward these services. The two railroads whose tracks enter the reservation have signified their approval of the plan and their desire to co-operate in every way.

Airport Program Ambitious

The airport section of the program is as follows: an area of 620 acres, 2,000 ft. back from the river front, with a main runway having a total length of 6,400 ft.; a seaplane anchorage, with 1,400 ft. of river front (out of the 3 mi. frontage of the whole property) and a basin 500 to 700 ft. in width; complete facilities for commercial, military and civil flying; immediate construction of a hangar unit, a terminal unit, freight and repair depots, central heating plant in addition to allocation of spaces to air, rail and marine companies.

Several firms already have approached city officials with propositions for the building of factories at or near the field. General Motors is said to have signified its intention to erect a $1,000,000 aircraft plant in part of the space allotted to industrial buildings. The Chamber of Commerce, which has been very active in pushing the Hog Island project, has been in communication with the Goodyear Zeppelin company in regard to the construction of a blimp or dirigible hangar in the area which has been set aside tentatively for lighter-than-air operations.

As soon as ratification has gone through, the city will begin to fill the lower sections of the property.

Negotiation Clause In Mail Bill Criticized

WASHINGTON (D.C.) — Comptroller General McCarl, in a memorandum sent to Representative Hogg of the House Post Office and Post Roads Committee, has registered vigorous objection to the "contract by negotiation" clause of the Watres air mail bill.

"It is contrary to the principles of American government," the Comptroller General states, "that legislative control over public funds as contemplated by the act in question, be surrendered to the agent or agency that is to spend it.

"The circustances and conditions which, evidently, influenced Congress to exempt from the advertising requirement contracts for carrying the mail by rail and on vessels plying between ports of the United States," he continued, "do not exist or arise in the matter of air mail contracts. Railroads and the vessels referred to either are the only available means of carrying the mail over the particular route or else they operate on established schedules between the points regardless of whether mail is or is not carried."

Quoting a recent decision (6 Comp. Gen. 5570) Mr. McCarl stated, "The air is an open field without rights of way or routes within the control or monopoly of anyone, but apparently open to all who may furnish or satisfy of their ability to furnish the equipment, etc., to carry out the undertaking. Hence there would appear to be no sufficient reason why there should not be competition in the matter of those air mail contracts."

Portland Plant Nears Completion

PORTLAND (ORE.)—Portland Municipal Airport's two new hangars and administration building are rapidly nearing completion. When finished the three structures will cost about $125,000. The administration measures 170x 40 ft. and is three stories high, the third story being a tower for traffic control, press and weather bureau. The building will house administrative offices of the port and companies flying from the field, a restaurant, waiting room, and observation room for spectators. The inner court formed by the U-shaped layout of the buildings will be used for parking automobiles. Excavation for the new approach to the airport has been started and the improvement will be finished by the middle of the summer.

Columbus Getting Weather Unit

COLUMBUS (OHIO)—U. S. Weather Forecaster W. H. Alexander has announced the Columbus bureau will install a complete weather station at Port Columbus. Cost of maintenance and operation will be about $15,000 annually. It will be ready for operations about May 1 and three observers will be employed at the outset; two will be added later.

Bids For Five Mail Routes Due April 28

WASHINGTON (D. C.)—Bids for operation of five air mail routes for two months beginning May 6 have been called for by the Postmaster General, and will be opened in the office of the Second Assistant Postmaster General at noon April 28. This call for bids may be withdrawn, and any or all bids may be rejected, in case pending legislation before Congress (the Watres Air mail bill) affecting readjustment of air mail compensation is passed by that body and signed by the President before May 5.

The routes involved, with name of the present contractor, are as follows: New York-Boston, Colonial Air Transport; St. Louis-Chicago, Robertson Aircraft Corp.; Chicago - Fort Worth - Dallas, Tex., National Air Transport; Salt Lake City-Los Angeles, Western Air Express; Salt Lake City-Pasco, Wash., Walter T. Varney.

U. S. and Canada Discuss Radio

NEW YORK (N. Y.)—At an informal conference between representatives of the United States and Canada April 10-11, recommendations were considered which should lead to co-ordination of airway radio in the two countries. Since Canada plans to establish a trans-continental system of radio beacons, it was agreed that steps must be taken to prevent interference with similar routes in the United States. It will also be necessary to co-ordinate the radio systems to provide radio-equipped routes between the two countries. Canada was represented at the conference by Comdr. C. P. Edwards, director of radio of the Department of Marine, and Maj. W. A. Steel, of the Department of National Defense. The American representatives were headed by W. D. L. Starbuck, chairman of the Federal Radio Commission, and Col. Clarence M. Young.

Complete Survey Plans For N. Y.-St. Louis Airway

WASHINGTON (D. C.)—Survey of the New York-St. Louis airway has now been completed by the Aeronautics Branch of the Department of Commerce, and it is announced that construction work will begin in the immediate future. Parts of the proposed route are already lighted and provided with intermediate fields, but facilities must be installed between St. Louis and Indianapolis, via Terre Haute, Ind., as well as between Columbus, Ohio, and Philadelphia, via Pittsburgh and Harrisburg, Pa. These two portions upon which construction must be undertaken are respectively 233 mi. and 412 mi. Approval has been granted for installation of five radio range beacons, twelve intermediate fields, and 50 beacon lights.

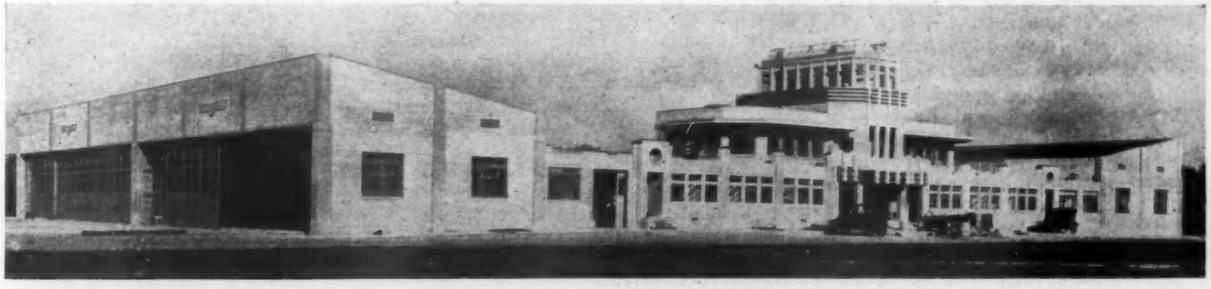
Intermediate fields have been provided by the following cities along the route, and leased to the Department of Commerce at $1 per year: Greenville, Effingham, and Casey, Ill.; Greencastle, Ind.; Newark, Zanesville, and Cambridge, Ohio; Washington, Williamsburg, Newton-Hamilton, and Blain, Pa. An intermediate field has also been provided by Wheeling Steel Corp., Wheeling, W. Va.

Radio beacon stations will be constructed at St. Louis; Terre Haute, Ind.; Columbus, Ohio; Pittsburgh and Harrisburg, Pa. There are existing landing fields or airports available along the route at these points and at Indianapolis, Ind.; Indiana, Ebensburg, Middletown, Lancaster, Coatesville, and Philadelphia, Pa. Cost of conditioning the fields at Williamsburg, Newton-Hamilton, and Blain, Pa., will be paid by the state.

Curtiss-Steinberg Opened

EAST ST. LOUIS (ILL.)—After a year's preparation, the 569-acre Curtiss-Steinberg Airport is ready for extensive operations. Fifty miles of drain tile have been laid under the surface to carry the water into a large channel at the boundaries. Three 1,700 x 100 ft. concrete runways have been completed, and three 120 x 120 ft. hangars are now in readiness.

Boundary lights have been installed and a 2,000,000-cp. beacon has been delivered. A Sperry flood light of 4,000,000 cp. has been installed. The airport is about 6 mi. from the St. Louis business district.



The administration building and adjoining hangars at Portland (Ore.) Municipal Airport. A parking area is in the rear.

AIRPORT CONSTRUCTION PROJECTS

East

WORK is not quite finished on the new airport at Millidgeville, St. John, N. B., but the field is already in good condition for landing, according to reports. The port has accommodations for both sea and land planes. Two runways, each 150 ft. wide, and one, 1,800 ft. and the other, 2,200 ft. long, have been completed.

The Harrisburg (Pa.) Flying Service, Inc., is developing a 139-acre field to be known as the Penn-Harris Airport, 3½ mi. from the center of Harrisburg. Hangars are being erected, and it is expected that the port will be ready for use by the middle of May. Among features planned for the port are a runway and catapult for gliders, and a photo laboratory.

Joseph P. McCabe, Inc., has been awarded the contract, amounting to $108,054, for improving the roads at and leading to the Boston Airport, and for improving the automobile parking space at the port.

It is expected that an additional airport loan of $2,500,000 will be voted at the next meeting of the Maryland State Legislature to be used for development of the Baltimore Municipal Airport.

Caribou, Me., has voted to spend $15,000 for improving its airport. Of this, $13,000 will be used for hangar improvements and $2,000 for leasing additional land.

Titusville Airways, Inc., is planning to build a three-plane hangar and otherwise improve facilities at the Titusville (Pa.) Airport.

Construction work for the improvement of Miller Field, New Dorp, Staten Island, N. Y., is in progress.

South

Jones, Roessle, Olschner & Weiner, architects, have been directed by the Commission Council of Shreveport, La., to prepare plans for the projected municipal airport, to be constructed on the Free State Plantation at Augurs, and industrial subdivision of Shreveport. The port will comprise 300 acres.

The new brick office building at the Jacksonville Municipal Airport has been officially opened, and the old building will be repaired and used as a waiting room. The four runways and the lanes to the gasoline stations at the port are being widened and lengthened.

Plans are being drawn up to provide additional hangar space at Drew Field, the Tampa Municipal Airport. It is expected that the new construction will begin this spring.

A stucco building, containing offices and waiting rooms, will be built at Corpus Christi (Tex.) Municipal Airport at a cost of about $1,500.

Leveling and draining are in progress at the 90-acre Victoria (Tex.) Airport, and the installation of a system of signal lights is planned.

The Wynne (Ark.) Chamber of Commerce has requested the Department of Commerce to send a representative to look over possible sites for an airport at Wynne, and suggest lines of development.

Austin, Tex., has acquired a municipal airport. An administration building will be begun shortly at the field, which is being leveled at present.

The northeast end of the Memphis Municipal Airport is being graded by Hughey Brothers, contractors.

An airport has been established at Marlin, Tex., and the building of runways has been begun.

Wedell-Williams Co. plans to develop and operate an airport at Opelousas, La.

Central

The Springfield Aviation Co., Springfield, Ill., has announced plans for construction of an all-steel, 80 x 80-ft. hangar at its airport. The hangar will accommodate fifteen small planes and is to cost $10,000. An electric gasoline pumping unit is being installed at the port, and parking facilities are being improved.

Plans to develop a 106-acre tract northeast of Charles City, Ia., as an airport have been announced by Carlisle Ellis, who proposes to build a hangar, install lighting, water, and gas service, and open a repair and machine shop at the field.

Work is about to start on the $18,000 filling station, to be erected by the Standard Oil Co. at Port Columbus. The station will be built of buff brick with black trim.

B. Russell Shaw Co., Inc., are preparing preliminary plans for a waiting room, offices, and shop to be built for the Von Hoffmann Aircraft Corp. at the St. Louis Municipal Airport.

The Potter (Neb.) Booster Club has appointed a committee to inaugurate measures for procuring an emergency landing field there.

Des Moines has voted a $200,000 bond issue for the purchase, equipment and maintenance of a municipal airport.

Council Bluffs (Ia.) Airways plans to erect a five-place hangar at the new municipal airport.

North Central

The Milwaukee County Board Highway Committee has approved the erection of an 80 x 120-ft. hangar, to cost $30,000, at the county airport. The committee has also approved four contracts totaling $58,806.80 for grading, drainage, etc., at the airport.

The Lakeshore Airport, an 80-acre field at Muskegon, Mich., has been opened as a commercial airport by the Lakeshore Airways. The port has five runways, each approximately 3,000 ft. long.

A fence, 3½ ft. high, is being built along the west and south sides of the Wold-Chamberlain Airport, Minneapolis, to prevent the public from trespassing on the landing area.

Royal Oak Flying Field, near Birmingham, Mich., has been officially opened to the public. The field comprises 152 acres, and has two hangars.

Northwest Airways, Inc., has received permission from the city of St. Paul to build a garage adoining its hangar at the municipal airport.

West

Work is in progress on the building for the Flying Club of California at Grand Central Air Terminal, Glendale, Calif. Dedication is scheduled for July 4. Facilities will include hangars, guest rooms, gymnasium, athletic equipment and a dining room.

The city of Denver has paid $6,750 for a 10-acre plot adjoining the municipal airport. Plans are under way for the construction of a north-south runway 1 mi. in length.

Border lights are to be installed at the Ogden (Utah) Municipal Airport. The fixtures and equipment have been purchased by the city for about $3,800.

Ground has been acquired for the establishment of an airport at Brush, Colo. A hangar will be built and four runways measuring 2,000 x 25-ft., of cinders will be installed.

Wm. J. Esser, of Long Beach, Calif., has been awarded a contract for erection of an addition to a hangar at the Naval Reserve Base, Long Beach.

The Coos and Curry County fairground at Myrtle Point, Ore., near Portland, is being converted into an airport.

Work on the Ponca City (Okla.) Municipal Airport is reported to be progressing rapidly.

Cross runways are being built at Boeing Field, Seattle, to provide for safe takeoffs into the south wind.

A contract has been awarded for installation of lights at the Davis-Monthan Airport, Tucson, Ariz.

Port Management Course Given

LOS ANGELES (CALIF.)—A special course in Airport Management was given from April 14-19, inclusive, at the University of Southern California, under the School of Citizenship and Public Administration. The course was administered by Prof. Earl W. Hill, head of the Aeronautics Department at the University. Special lectures were as follows: Selection of the Site, William J. Fox, chief engineer, Los Angeles County Regional Planning Commission; Layout, A. C. Zimmerman, architect; Zoning, W. M. Bishop, Western Air Express; Communications, Herbert Hoover, Jr., W.A.E.; Meteorology, Dr. Ford Carpenter; Hangar Construction, C. C. Cole, W.A.E.; Municipal Airports, Woodruff DeSilva, Los Angeles Airport Department; Operating Companies, Peyton Gibson; Private Airports, J. G. Woolley, vice-president W.A.E.; Air Traffic Rules, Capt. Walter Parkin, Aeronautics Branch; Legal Problems of Airport Ownership, Operation and Control, Col. W. Jefferson Davis, aeronautical counsel; Insurance, Robert Trow, Behrendt-Levy Insurance Agency; Airport Accounting, G. E. Hegardt, manager, Oakland Airport.

N.A.T.-United Case

(Continued from Page 826)

sought in the acquisition of Eastern to keep the balance of power in N.A.T. with those now in control.

North American Aviation is headed by men also identified with N.A.T. As stated before, the fight represents efforts of two of the most powerful holding groups in the aviation industry—United and Curtiss-Wright—to secure control of the New York-Chicago air mail service.

The N.A.T. directors elected at the meeting April 10 include: Trowbridge Calloway, Howard E. Coffin, J. Cheever Cowdin, T. B. Doe, Harold H. Emmons, Richard F. Hoyt, Paul Henderson, E. K. Hardy, Leonard Kennedy, C. M. Keys, Charles L. Lawrance, E. W. Lewis, C. T. Ludington, Dunlevy Milbank, Jeremiah Milbank, John J. Mitchell, John W. Pattison, Harold F. Pitcairn, Lester D. Seymour, D. M. Sheaffer, J. A. B. Smith, J. C. Willson, Philip K. Wrigley, C. W. Cuthell and Earle H. Reynolds. The new members are Messrs. Cowdin, Doe, Hoyt and Sheaffer.

Representing N.A.T. at the meeting in Wilmington were: C. M. Keys, chairman of the executive committee; Col. Paul Henderson, executive vice-president; Charles L. Lawrance, vice-president; John J. Mitchell, secretary and treasurer; Capt. Thomas B. Doe; Chester W. Cuthell; Lester D. Seymour, general manager; J. Cheever Cowdin; Henry G. Hotchkiss; and Daniel M. Sheaffer.

Frederick W. Jackson and Joseph Ripley represented United Aircraft & Transport Corp., of which they are directors. Mr. Ripley is vice-president of the National City Co., and Mr. Jackson is a member of the firm of Sherman & Sterling.

Standard and W.A.E. Shifts Made

LOS ANGELES (CALIF.)—Initial steps toward merging the physical properties and activities of the Aero Corporation of California and Standard Airlines with Western Air Express have been taken with the consolidation of the two companies' city ticket offices here. This action is being taken following the consummation on March 15 of a merger plan involving the above companies. Announcement of the change of the operations department from the Aero Corporation field at 94th Street and Western Avenue, and the status of the various executive officers under the new combination will be made soon.

W.A.E. Opens Three New Passenger Lines

AMARILLO (TEX.)—Western Air Express and its affiliated companies on April 10 inaugurated three new services from this city, which is one of the stops on the company's Kansas City-Los Angeles line. The new services radiate to Pueblo, Colo.; to Tulsa by way of Oklahoma City, and to Dallas and Fort Worth by way of Wichita Falls. The schedules are as follows:

4:10 p.m.	lv. Amarillo arr.	12:35 p.m.
6:00 p.m.	lv. Wichita Falls lv.	10:30 a.m.
7:30 p.m.	arr. Fort Worth and Dallas lv.	8:50 a.m.
4:05 p.m.	lv. Amarillo arr.	12:40 p.m.
6:10 p.m.	lv. Okla. City lv.	10:45 a.m.
7:10 p.m.	arr. Tulsa lv.	9:15 a.m.
1:15 p.m.	lv. Amarillo arr.	3:20 p.m.
3:15 p.m.	arr. Pueblo lv.	11:45 a.m.

All sections will be operated daily and Fokker tri-engined transports will be used except between Amarillo and Pueblo, where six-place cabin planes are in service. Standard Airlines and Midcontinent Air Express, W.A.E. subsidiaries, operate between Los Angeles and El Paso, and El Paso and Pueblo.

Air Mail Increases In Volume in March

WASHINGTON (D. C.)—Air mail increased in March by 70,152 lb. over the volume carried by the domestic contractors in February, according to the Post Office Department's monthly preliminary report. March volume reached 625,328 lb., which is the heaviest traffic since October when 705,772 lb., the record for 1929, was carried. The preliminary report is as follows:

	Mi.	Pounds, 1930 Jan.	Feb.	Mar.
Boston-New York.	192	7,391	11,399	9,465
Chicago-St. Louis.	278	3,618	4,249	4,211
Chicago-Dallas....	1,059	24,914	29,356	35,794
Salt Lake-Los Ang.	600	61,268	63,811	71,215
Salt Lake-Pasco...	530	18,117	18,672	22,002
Seattle-Los Ang...	1,141	18,484	18,753	20,396
Chicago-Minn.....	503	14,199	13,434	19,826
Cleveland-Pitts...	123	3,333	5,948	4,545
Cheyenne-Pueblo..	199	5,512	5,929	6,594
Cleveland-L'sville.	345	4,286	4,613	5,408
New York-Chicago	718	109,311	119,740	132,680
Chicago-San Fran.	1,932	127,074	136,930	155,322
New York-Atlanta	763	27,141	31,126	34,916
Albany-Cleveland.	416	4,971	4,709	5,068
Dallas-Galveston..	320	2,195	2,876	3,409
Dallas-Brownsville	529	6,626	7,360	7,618
Atlanta-New Orl's.	483	6,889	7,493	8,292
Chicago-Cincinnati	270	4,117	4,553	4,965
Atlanta-Miami....	736	11,440	15,349	13,957
Great Falls-Salt L.	489	5,283	4,644	4,528
Chicago-Bay City.	712	10,893	11,354	14,992
St. Louis-Omaha..	403	10,549	11,420	13,514
New Orl's-Houston	319	4,063	3,934	4,455
Chicago-Atlanta...	768	6,987	7,656	8,507
Pasco-Seattle.....	449	7,272	9,868	13,649
Total.....	...	505,933	555,176	625,328

Increase—70,152 lb.
Daily average—24,051 lb. for March.

F-32's On West Coast Run

LOS ANGELES (CALIF.)—With the arrival in this city on April 8, of the two new Fokker F-32 passenger transports, Western Air Express officials announced the machines would be placed on the regular Los Angeles-San Francisco run at the time of dedicating its new Valley Boulevard terminal April 17, 18, an 19. In connection with the commercial operation of the new F-32's it is said that Wrigley officials have plans for constructing an airport on Catalina Island to accommodate the new machines. The proposed field is within 18 min. of Avalon, the island resort city, and would make it possible to carry large excursion parties to the island by air. Regular trips are now conducted by Boeing flying boats operating from Wilmington to the island, and by Loening amphibions operating from the Valley Boulevard Airport to Avalon harbor, both of these services being conducted by W.A.E.

Start Making Stone Fog Lights

LOS ANGELES (CALIF.)—Production of Stone Fog Light products has been started in a new factory of 25,000 sq.ft. floor space, in this city. This company has taken over the Kay-Bee Manufacturing Co. and will continue to make a group of lights incorporating the special Amber-Ray lense development. The amber ray produced by this lense gives a light of penetrating powers which have been proved distinctly superior to other lights when used in bright sunlight, or at night in conditions of fog and smoke.

Air Mail Statistical Report for February

Route Number and Termini	Length of Route (Miles)	Frequency (Rd. Trips per Month Scheduled)	Miles of Service—Scheduled	Miles of Service—Actually Flown	Total Weight of Mails Dispatched (Pounds)	Amount Paid to Contractor
1. Boston-New York.....	192	23	9,882	8,648	9,160	$27,478.87
3. Chicago-St. Louis.....	278	56	31,136	28,514	4,246	10,748.95
3. Chicago-Dallas.....	1,059	56	117,876	99,427	29,359	88,061.71
4. Salt Lake City-Los Angeles	600	52	64,800	60,619	65,157	195,470.62
5. Salt Lake City-Pasco.....	530	56	60,017	42,634	18,667	56,000.25
8. Seattle-Los Angeles.....	(a)1,141	28	59,948	58,131	18,782	53,195.26
9. Chicago-Minneapolis.....	503	84	71,447	63,025	13,137	36,125.11
11. Cleveland-Pittsburgh.....	123	56	13,899	11,643	5,942	17,826.00
12. Cheyenne-Pueblo.....	199	28	11,629	10,336	5,920	4,913.86
16. Cleveland-Louisville.....	345	28	20,746	17,857	4,571	5,576.70
17. New York-Chicago.....	718	56	99,851	79,159	119,719	101,369.09
18. Chicago-San Francisco...	1,932	52	226,541	212,672	139,180	283,472.89
19. New York-Atlanta.....	763	28	54,219	46,822	32,355	97,064.06
20. Albany-Cleveland.....	446	24	21,585	18,371	4,516	5,010.63
21. Dallas-Galveston.....	320	28	18,134	17,555	2,876	8,311.80
22. Dallas-Brownsville.....	529	28	29,788	29,079	7,346	21,229.22
23. Atlanta-New Orleans.....	483	28	27,048	26,916	7,493	13,112.64
24. Chicago-Cincinnati.....	270	56	31,485	25,850	4,518	6,641.87
25. Atlanta-Miami.....	754	28	42,831	41,905	15,301	22,339.73
26. Great Falls-Salt Lake City	489	28	35,978	34,265	4,610	11,409.60
27. Bay City-Chicago.....	773	23	41,932	33,601	11,313	10,068.43
28. St. Louis-Omaha.....	404	56	45,413	43,251	11,322	8,887.87
29. New Orleans-Houston....	319	28	17,864	17,785	3,934	3,934.50
30. Chicago-Atlanta.....	768	28	43,008	41,550	7,651	5,967.54
32. Pasco-Seattle.....	449	28	30,128	26,976	9,868	888.14
	14,367	986	1,227,195	1,096,591	556,913	$1,095,105.34

(a) Southbound trip not operated between Seattle and Portland.
Supplemental Payments Route 3, Dec.; 16 lbs. $48.00. Route 3, Jan.; 60 lb., 6 oz. $181.12. Route 17, Jan.; 711 lb. $699.50.

NOTE—Close comparisons between the various air mail reports issued from time to time will reveal slight discrepancies in various figures. These are not errors, strictly speaking, but are due to various readjustments which have to be made from month to month after the preliminary figures have been released.

W.A.E. Group Insurance Policy Further Described

HARTFORD (CONN.)—Group insurance in excess of $1,000,000, covering all employees including pilots and co-pilots, has been written by the Connecticut General Life Insurance Co. of Hartford on Western Air Express. This is the first time that any insurance company has ever issued a policy covering every employee of an airline. [See AVIATION for April 5.]

Officials of the Connecticut General say that the policy became effective March 18, and that it was granted after an exhaustive study of the aviation industry, and the methods used by W.A.E. A special representative was sent by the insurance company to Los Angeles during the investigation, and following his inspection of all operation records and shop methods, the policy was granted.

The insurance representative discovered that Western Air Express planes have flown more than 4,200,000 mi. without injury or death to a passenger, and that the 425 employees of the organization have been safeguarded in every possible manner.

Rates little higher than usual

W.A.E. is paying considerably more than half of the total annual premium on the policy. Although the exact rates were not disclosed, officials of Connecticut General say that they are only slightly higher than ordinary group insurance. Under the plan it makes no difference whether the employee is an office worker, mechanic, pilot, or executive. Each will receive, in the event of total disability or death, a stated amount, the principal being according to whichever group the employee belongs. The element of hazard does not enter into the formation of these groups. The groups are formed according to the incomes of various employees, and the amount of monthly premiums they can afford. It is on this basis that the death or total disability principals were determined.

One factor which affected to no little extent the insurance company's decision to issue a blanket policy was, according to company officials, the fact that W.A.E. uses Pratt & Whitney Wasps and Hornets in practically all of its planes. The officials were of the opinion that these engines have attained such a degree of safety and stability, that they were justified in issuing such a policy which included pilots.

Boeing Reports Life of Planes

SEATTLE (WASH.)—Of 24 Boeing planes put into service on the Chicago-San Francisco route July 1, 1927, 19 are still in operation. One plane has been flown 3,000 hr., five more than 2,500 hr., and many over 2,000 hr. The oldest plane in the service of Pacific Air Transport, Boeing subsidiary operating between Los Angeles and Seattle, has been flown 2,600 hr., and a number of others qualify as veterans.

Boeing Gets Iowa City Port

IOWA CITY (IA.)—The City Council has formally approved a 50-yr. lease with Boeing Air Transport by which the latter will take over the Municipal Airport without rental for period of the lease, which, however, may be cancelled at any 10-yr. period. Boeing agrees to spend $37,000 on the field and the city will contribute $13,000, the balance of a $70,000 bond issue authorized last spring for purchase and establishment of a port.

Airway Briefs

United States Air Lines has started a new line from Wichita, Kan., to Oklahoma City via Ponca City, Okla. The company is also planning to start a line between Wichita and Denver via Hays, Kan.

Changed plans will give the airway radio station now building at Lunken Airport, Cincinnati, Ohio, an operating radius of 300 mi. The completed installation will cost about $40,000.

A new airport has been opened at Senneterre, Abitibi County, Province of Quebec, by Continental Aero Corp.

Delta Air Lines planes now make the trip between Fort Worth, Tex., and Atlanta, Ga., in one day, leaving at 8 a.m. and arriving at 5:30 p.m.

Work has been started on the construction of a Department of Commerce intermediate field 2 mi. north of Fontana, Calif.

Plans are being made for a two-story twenty-room hotel to be erected at the west end of Roosevelt Field, L. I., N. Y., at a cost of $75,000.

A special air mail station will be established at Bowles Airport, Springfield, Mass., May 27-June 1, in connection with the visit of the New England Air Tour. A special cachet for use on outgoing air mail letters has been authorized.

Royal Gorge Airport, near Cañon City, Colo., owned by Royal Gorge Airways, was dedicated April 6.

An analysis of figures from 22 operators recently made by American Air Transport Association gives the average fare now in effect as 7.6 cents per mile, 2.3 cents per mile higher than average cost of rail plus Pullman. Before recent reductions, the average air fare was 11.5 cents per mile.

Boeing System reports an increase to 22 per cent in the number of women passengers on the company's air lines.

Sacramento (Calif.) airport was dedicated April 11-13, during which time an air circus was held.

Western Air Express reports successful testing of a new plane-to-ground radio system developed by company engineers.

Varney Air Lines has received permission from the Post Office Department to change the Seattle-Salt Lake City air mail schedule, making it about two hours later. This is made possible by the longer hours of daylight.

City of Tampa, Fla., is being sued for $50,000 by McMullen Aircraft Co. and Airways Transport, Inc., as a result of the fire which destroyed planes in the municipal hangar last December.

Curtiss-Wright Flying Service of New England has arranged for a series of air tours to historic points in connection with the Massachusetts Bay Colony's tercentenary celebration.

According to the latest report, there are now 63 commercial airports in Michigan. The last to be licensed (temporary) is the Northville Airport, now in use as a test field for Issoudun Aircraft Co.

A joint air ticket agency has been established at Utica (N. Y.) airport.

Coupon books in denominations of $55 and $110 are being sold by Rapid Air Transport Co., Omaha, Neb., for use on the Omaha-Kansas City Line, and other lines which the company plans to inaugurate.

Management of Universal division of American Airways at Rosecrans Airport, Kansas City, Mo., has been taken over by Fairfax Airports, Inc., with James Shelton as field manager both for the port and the airline.

A beacon light composed of 1200 ft. of Neon tubes arranged against a white background is to be installed on the Continental Life Building, St. Louis, Mo. A new radio beacon is being installed at the Municipal Airport.

Bids for purchase of Phoenix (Ariz.) municipal airport have been received from Acme Investment Co. and F. R. Stewart. The city is considering acquisition of Phoenix Sky Harbor from Scenic Airways, Inc.

Survey of the San Diego-El Paso airway is to be undertaken by the Aeronautics Branch in the near future.

State of Florida and cities along the route are planning to construct a lighted airway between St. Petersburg and Daytona Beach, crossing the state with intermediate fields at Lakeland, Haines City, Kissimmee, Orlando, and Sanford.

Wesley Raymone of Lakeland, Fla., is completing a photographic survey of airports in the state and plans to assemble his pictures in a book for pilots.

Davis Air Lines, Inc., has purchased Birmingham Passenger Airways, of Birmingham, Ala. Two planes belonging to the latter firm will be used in the activities of Southeastern Aeronautical Association, a group of flying clubs formed under the direction of L. J. Sauerborn, vice-president and general manager of Davis Air Lines. The company plans to start a new Jacksonville-Birmingham line May 15.

The site selected for development as a municipal airport at Kamloops, B. C., has been approved by the Canadian director of civil aviation.

The Rimouski-Montreal air service for trans-Atlantic mail is to be reopened for the season April 28.

FOREIGN ACTIVITIES

French Club Offers Light Plane Speed Cups

PARIS (FRANCE) — Two new international trophies for light plane racing have recently been donated by Aero Club de France, to be offered in alternate years for land and seaplanes, beginning with a landplane race in 1931. The trophies will be awarded entirely on the basis of speed, and it is hoped that they will provide encouragement for the development of really fast small planes. Weight limits are 992 lb. for land planes and 1,221 lb. for seaplanes. Competing machines must, of course, comply with C.I.N.A. rules for racing planes.

Purposely, the figures for gross weight have been made higher than the F.A.I. limits for light planes, so that records achieved by them would not be recognized under present rules. This is intended to prevent confusion of categories between real touring planes and the special racing machines which are expected to compete for the new trophies. Detailed regulations may be obtained from Aero Club de France, 35 Rue Francois Ier, Paris VIII.

Release Napier Engine Figures

LONDON (ENGLAND) — Performance figures of the special Napier Lion engine which was installed in the Gloster VI for the Schneider Cup races have recently been released by the Air Ministry. With reduction gear and supercharger, the engine weighs 1,130 lb., and produces 1,275 hp. at 3,600 r.p.m., giving a weight per horse-power of 0.889 lb. There are twelve cylinders, arranged in the broad arrow or W form. Bore and stroke are 5½ x 5⅛ in., length overall is 64⅛ in., width 37⅜ in., height 34⅛ in. It is said that recent improvements in arrangement of the air intake for the carbureter give better performance than was secured last summer.

German Air Taxis Planned

BERLIN (GERMANY) — An air taxi system, using about 50 planes at a rate of about $.42 per mile for the entire machine, regardless of the number of passengers, is to be inaugurated by Luft Hansa about May 1. It is expected that this service will be particularly popular between cities and resort points, and places of especial interest such as Oberammergau, where the Passion Play will be presented this year. The above rate will apply only when passengers are being carried; that is, there is no charge for the return trip.

French Weather Service Improved

PARIS (FRANCE)—The establishment of what will be called the Air Navigation Committee has been decided upon by the French National Weather Bureau, in order to provide better cooperation between the Weather Bureau activities and the pilots. The latter will be asked to state their special requirements and difficulties, and improvements they desire. Under such a system, dissemination of weather news will be simplified and the transport operations better served.

Used-Plane Market Develops in England

LONDON (ENGLAND)—The used aircraft market has developed considerably in this country. Second-hand machines are available through such organizations as the De Havilland Aircraft Co., and National Flying Services, Ltd., the latter of which issues a regular list of used machines. The market is said to be supplied to some extent by machines discarded by private owners in favor of new models being produced from time to time, much after the practice of the automobile business.

The used plane market, so far, has been confined largely to light machines. Prices vary, of course, some machines being sold for as low as $2,000 although costing about $3,500 new. A noticeable feature of the advertisements in this field is the usual statement as to whether or not the plane has automatic slots, a device that now costs about $150 in addition to the standard price. A second-hand flying boat may be bought for $5,000, while a rebuilt S.E.5A of War design is priced as low as $1,250, and an Avro needing a renewal of its airworthiness certificate, may be bought for $500, including a rotary engine.

British Private Pilots Plan Tour

LONDON (ENGLAND)—At least twenty English light plane owners and guests will participate in an air tour of Europe which is being organized by Nigel Norman, a director of Heston Airport. Only pilots with Class A certificates will participate, and the tour will be accompanied by a special mechanic and two planes carrying spare parts. The trip will take about ten days, with an average of 3 hr. flying per day. Among the cities to be visited are Brussels, Cologne, Frankfort, Munich, Vienna, Prague, Berlin, Amsterdam. The pilot in charge will be Capt. V. H. Baker, and Gordon Selfridge, Jr., is among those planning to go.

F.A.I. Establishes Rulings on Records

PARIS (FRANCE)—Only five records are now recognized by the F.A.I. as "World Records," all others being classified as "International Records." The former are: duration (non-stop); distance in a closed circuit (non-stop); airline distance (non-stop); altitude; maximum speed on 3 km. course. These are open alike to airplanes, seaplanes, balloons, dirigibles, without reference to classification. The classification of International Records remains as before, except that the 4,000 kg. load hitherto recognized for Class C bis (seaplanes) is dropped, being replaced by 5,000 kg. load. In addition, categories for 7,500 kg. and 10,000 kg. load are now recognized, both for land and seaplanes.

Eight new International Records have recently been approved by the F.A.I. Two of these are distance and duration with 1,000 kg. load, made by Costes and Codos in a Breguet plane (AVIATION, March 15); and the other six are records with various loads made with the new Caproni C. 90 (AVIATION, April 5), including the new 7,500 kg. and 10,000 kg. categories which have just been approved.

French Plan Transport Mergers

PARIS (FRANCE) — Proposals have been made in the Chamber of Deputies which would lead to the merging of French air transport lines into three groups. The eastern group would comprise Air Union and Air Union-Lignes d'Orient; a western group would include Societe Generale de Transports Aeriens and Compagnie Internationale de Navigation Aerienne; a southern group would be made up of Compagnie Generale Aeropostale and Compagnie Transafricaine d'Aviation. It is said, however, that mergers actually under consideration by the various lines would unite Societe Generale des Transports Aeriens with Air Union, and Air Union-Lignes d'Orient with Compagnie Internationale de Navigation Aerienne.

New Weymann-LePere Plane Built

PARIS (FRANCE) — The Weymann-LePere company recently completed a new tri-engined monoplane, designated as the WeL 60. The three Hispano-Suiza watercooled engines of 250 hp. each are mounted above the center section of the wing and operate pusher propellers. The wing has a span of 92 ft. The machine is 65.5 ft. long and 19 ft. high. The wing area is 860 sq.ft. Flight tests are to be undertaken soon.

Foreign Briefs

A new Helicogyre, with four revolving wings each of which has a 32 hp. Cherub engine installed near the tip, is undergoing preliminary tests at Orly Airport, France.

Entries from fourteen countries have been received for the Air Safety Congress to be held in Paris next December.

The contract between the Chinese Government and China Airways (controlled by Curtiss-Wright interests) is being revised.

The Nakapima Works, Japan, has acquired license to manufacture Fokker planes in that country. Kawasaki Company is licensed to manufacture Dornier planes.

Preliminary to the establishment of air passenger and mail service to the southern tip of South America, Compagnie Generale Aeropostale has opened a line from Buenos Aires to Rio Gallegos, near the Straits of Magellan. It will be operated weekly with stops at Bahia and Commodore Rivadavia.

A ruling which has just been issued by the Department of Aviation of the Mexican Ministry of Communications forbids acrobatics over any internationally used airport in Mexico. Planes are also required to take off from the right side of the field and land at the left.

Arrangements have been made to provide pilots on the Mexico City-Tijuana line with detailed weather reports by 6:30 a.m. daily.

Cloyd Clevenger, associated with Eduardo Iturbide, Jose Suarez and Antonio Riva, has applied to the Mexican Government for permission to establish a civilian flying school at Valbuena Field, Mexico City.

A new airport has been established at Fresnillo, state of Zacatecas, Mexico, and is used as a stop on the Mexico City-El Paso line. It is owned by the city and Fresnillo Mining Co.

Mexican Ministry of War and Marine is considering plans for establishment of a chain of Mexican airports exclusively for military use.

Airports are now ready for use at Camp Tonala, Arriaga, Tapachula, Suchiate, Comitlan, San Cristobal las Casas, Villaflores, Tuxtla Gutierrez, Ocozingo, Pichucalco, Pijijiapam, and San Bartolome, in the state of Chiapas, Mexico. The state is also preparing emergency fields at Hacienda de Santa Catarina, Concordia, Salto de Agua, Mapastepec, and Palenque.

All airplane passengers entering Mexico hereafter must show certificates of vaccination and health certificates.

A Mexican chapter of the U. S. National Aeronautic Association is being organized in Mexico City.

American capitalists are backing a company which plans to erect an aircraft and engine factory in Puebla City, near Mexico City.

Breguet planes were flown over 250,000 mi. on commercial air lines in 1929 without even a forced landing.

Italian air estimates presented by General Balbo March 14 ask for a total expenditure of about $37,625,000. No plans for new airways are under consideration.

One Napier engine still in commercial transport use has been flown over 350,000 mi., and the average distance covered by fourteen Napier engines on Imperial Airways planes is 265,000 mi., all of them being still in service.

Miss Margret Fusbahn, 22-year-old German flier, is reported to have established a new altitude record for Class C planes by attaining a height of about 15,900 ft. in a Klemm equipped with 40 hp. Salmson engine. The former record of about 12,800 ft. was made last year by a Polish aviator.

British Air Force engineers are said to be perfecting a bomb-carrying plane to be operated without crew, intended to crash with its load of explosive on reaching its destination.

The Duchess of Bedford has reached Tunis in the course of her London-Cape Town flight. She is accompanied by Capt. C. D. Barnard and Robert Little.

Deutsche Luft Hansa has proposed extension of air-rail agreements to cover all European countries, at the meetings of the International Railway Union at Berlin and Nice.

Reductions of from 30 to 40 per cent in air mail rates to Europe, the United States, and to other South American countries, have been made by the government of Peru.

Condor Syndicate has extended its Brazilian line from Rio de Janeiro to Natal, bringing its operating mileage along the coast to 2,301.

The French Air Ministry has proposed in the Chamber of Deputies a bill which would subsidize private flying to the extent of part of the original cost of planes, and 50 per cent of garage and maintenance charges.

Captain Jiminez and Captain Iglesias, the two Spanish fliers who crossed the South Atlantic last year, have been made Knights of the French Legion of Honor.

The 1930 budget of the French Air Ministry, as recently introduced in the Senate, totals about $79,400,000.

General Hirschauer recently gave out the following figures for fatalities in the French Air Service per million miles flown: 1925, 4.04; 1926, 4.83; 1927, 2.42; 1928, 4.83; 1929, 4.8.

Clubs affiliated with the British Gliding Association have recently been formed at Cardiff, Evesham, Gloucester, Halton, Harrogate, Kent, London, Manchester, and Newcastle.

Lord Wakefield has given $4,860 to start a fund to promote gliding in England, as well as a cup to be awarded for competition, on a basis to be announced later.

The British Air Ministry is investigating the possibility of establishing a landing area, which would be about 1,800 ft. square, on the top of Waterloo Station, in the center of London. The estimated cost is $25,000,000.

It is reported that Handley Page, Ltd., is building eight 40-passenger planes for Imperial Airways' London-Paris service.

Selfridge's Department Store, London, now sells Desoutter, Moth, Bluebird, and Klemm planes.

Bleriot Aeronautique is building a special monoplane for an attempt to break the world's distance record. It will use a 600 hp. Hispano-Suiza engine, and will carry about 1,590 gal. of gasoline.

Negotiations for night air mail service from Scandinavian cities to Berlin, Amsterdam, London and Paris have been concluded at a conference in Oslo, and contracts now being made will probably result in the inauguration of the service by May 15. The Berlin-Moscow route is the only night mail now flown in Europe.

A delegation of Finnish officers and engineers has gone to France to inspect various airplane engine factories, and presumably to negotiate rights for the Finnish government to manufacture some make of French engine under license.

British Royal Aero Club has abandoned plans for reviving the Aerial Derby this year, owing to lack of entrants.

New Aero Clubs recently formed in France and Belgium are: Club de l'Escaille, Paris; Aero Club Leger des Alpes, Grenoble; Club d'Aviation Legere des Flandres, Lille; Club d'Aviation Legere, Le Mans; Club Francais de Tourisme Aerien.

At a recent British Air Ministry examination for Class 2 Navigator's certificate, the highest mark was made by Miss F. M. Wood, lecturer in mathematics at London University.

Scadta Announces Record of Operations

BARANQUILLA (COLOMBIA)—Statistics covering the operations of Scadta in the 10 yr. of its notable existence have been released by the company headquarters here. The figures are as follows:

	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Total mi. flown..	2,703	53,963	128,743	185,451	169,531	183,206	303,960	329,550	580,846	765,015
Total passengers.	12	379	1,137	1,318	1,084	1,134	2,116	2,667	4,956	5,401
Passenger mi.....	5,000	22,850	166,794	257,044	272,212	302,535	652,710	798,162	1,300,190	1,551,601
Weight of pass., baggage and express in lb.....	1,792	64,220	185,069	224,403	183,568	205,072	383,600	464,554	954,609	1,017,181
Weight mail in lb.	112	3,472	10,819	18,569	23,946	27,149	59,450	82,006	111,881	133,244
Weight total pay load in lb.....	1,904	67,670	195,888	332,573	207,514	232,221	443,050	546,560	1,066,491	1,150,344

Are You Paying for Timken Bearings Without Getting Them?

The basic requirements of an efficient anti-friction bearing are (1) anti-friction efficiency, (2) maximum radial capacity in the smallest unit of space, (3) thrust capacity without sacrificing the principle of design, (4) combined radial and thrust capacity, (5) take-up to facilitate assembly and compensate for wear.

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TIMKEN *Tapered Roller* **BEARINGS**

Made to the most rigid specifications to stand the gaff of training and sport

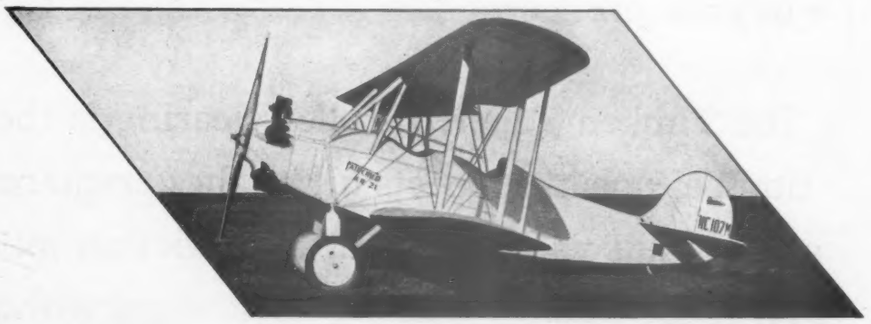
SUPPOSE the student does level off high! He'll learn something—and the ship can stand it. Fairchild KR Biplanes are taking the punishment of training work day after day, and of sport flying too. Their unusual ability to stand the gaff is due to design, and to the use of most exacting specifications that mean a large margin of strength. All welds, for instance, are in shear and not in tension. Fuselage, landing gear and other parts are of chrome molybdenum steel, which gives maximum strength where it is needed, yet holds the weight to the minimum. . . . Climb, often a vital factor in safety, distinguishes these ships, which have rates of 800 and 775 feet per minute. Ships that have to be wished out of small fields and over trees and wires have no place today. Fairchild believes that the only justifiable thrill in flying is based on complete confidence in the ability of the plane to fit the use you make of it. . . . In spite of their unusual strength, these planes are light. The power of the engine is used not to haul a heavy structure, but to provide speed and climb, and carry the fuel, pilot and passengers. Fairchild KR Biplanes are competitive in price. It is the opinion of experienced pilots that they offer better values in construction, performance, maneuverability and completeness of equipment. A booklet giving full descriptions will be sent on request.

FAIRCHILD KR-34. A. T. C. 162. THREE PLACE
Performance: TOP SPEED, 123 M.P.H. CLIMB, 800 FT. P.M. DISPOSABLE LOAD, 885 LBS.

Specifications: Wright J-6, 165 h.p. engine and metal propeller. Note really complete equipment: airspeed indicator, altimeter, compass, dash gasoline gauge, booster magneto, tachometer, dual controls, brakes, oil pressure and temperature gauges, cockpit covers, engine cover, logbook, tiedown ropes, tools, first-aid kit, fire extinguisher, engine instruction book, wired for navigation lights. This plane can also be had with 150 h.p. Comet engine, which alters performance slightly and increases disposable load and economy. Price, with either engine, $6575 flyaway Farmingdale.

FAIRCHILD KR-21. A. T. C. 215. TWO PLACE
Performance: TOP SPEED, 113 M.P.H. CLIMB, 775 FT. P.M. DISPOSABLE LOAD, 535 LBS.

Specifications: Kinner 100 h.p. engine and wood propeller, Complete equipment: airspeed indicator, altimeter, compass, dash gasoline gauge, booster magneto, tachometer, oil pressure and temperature gauges in both cockpits, dual controls, engine cover, cockpit covers, tiedown ropes, tools, fire extinguisher, first-aid kit, engine instruction book, logbook, wired for navigation lights, celluloid inspection windows at all control bearing points, detaching pan. Price, $4685 flyaway Farmingdale.



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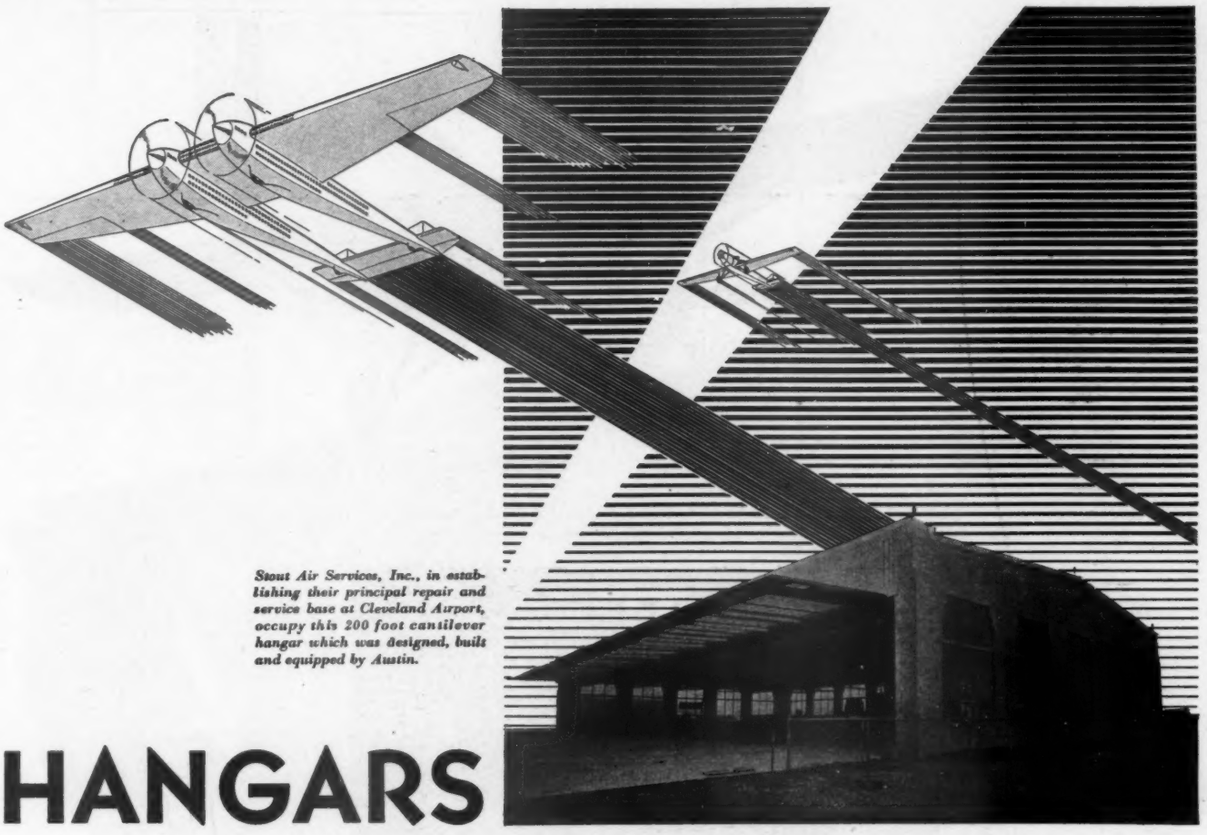

Stout Air Services, Inc., in establishing their principal repair and service base at Cleveland Airport, occupy this 200 foot cantilever hangar which was designed, built and equipped by Austin.

HANGARS

. . . . to house the 100 passenger transport or 3-place sport models

ONCE a simple shelter with 40 or 50 ft. clear span, capable of protecting against wind and weather, was sufficient for a hangar. Today, however. the hangar must provide up-to-the-minute repair and servicing facilities, comparable in efficiency to those now in use in other fields of transportation.

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Hangars with 50 or 500 ft. clear door opening . . . clear floor areas . . . power-operated doors that permit opening of the entire front in 50 seconds or sliding doors which one man can move easily . . . hangars with pleasing architectural design and abundant daylighting . . . these are the hangars that Austin's nation-wide organization is designing and building.

For a modern hangar, large or small; an aircraft manufacturing or accessory plant; a complete airport, with site selection, survey and report, design and construction — Austin Engineers can be consulted to advantage. Wire, phone, write the nearest office for approximate costs . . . or use the convenient memo below.

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The Austin Company of Texas" Dallas The Austin Company of Canada, Limited

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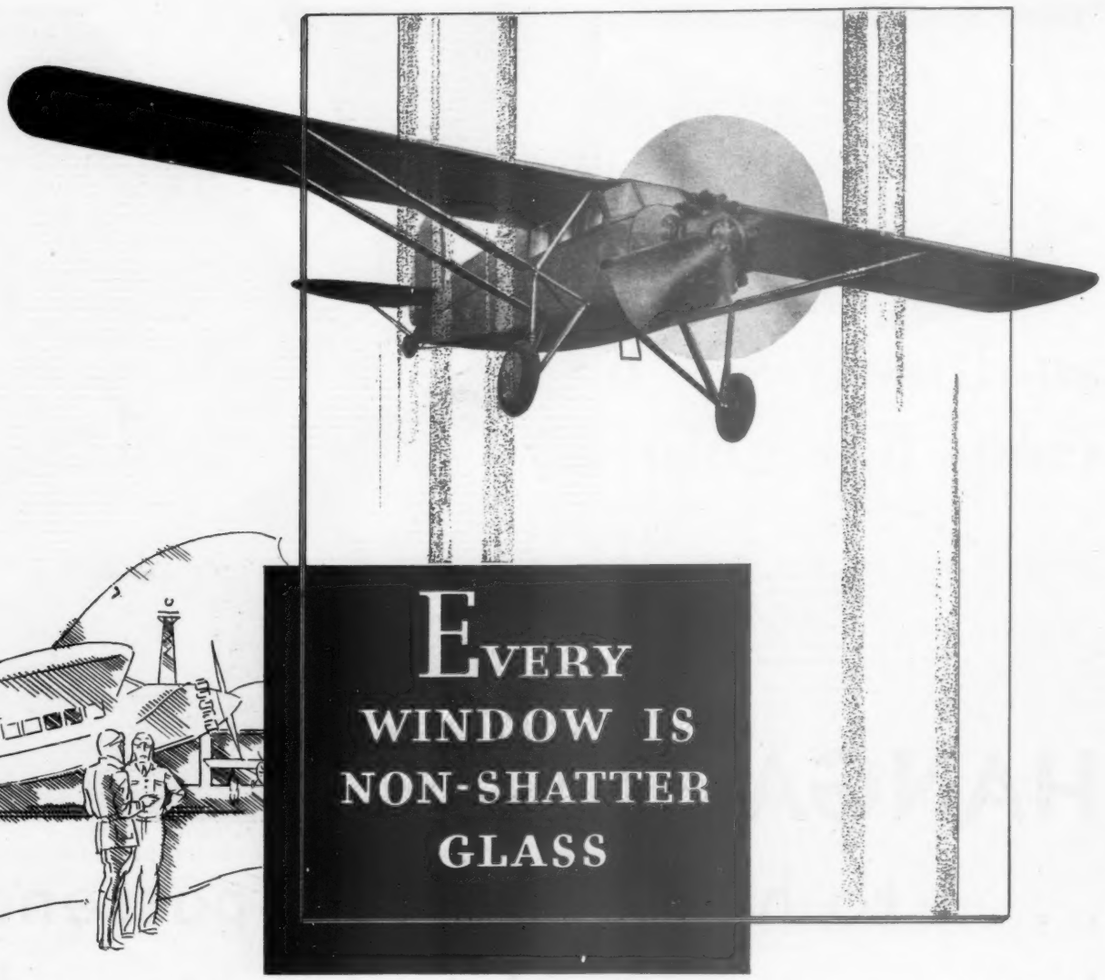

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DUPLATE
Fine plate glass. Laminated thickness ¼ in. Weight per sq. ft. 48 oz.

DUOLITE
Flat-drawn sheet glass. Laminated thickness 3/32 in. Wt. per sq. ft. 35 oz.

AEROLITE
Thinnest laminated glass made. 1/8 to 5/32 in. thick. Wt. per sq. ft. 24 to 36 oz.

THIS big six-passenger Stinson Detroiter, like all passenger planes built by the Stinson Aircraft Corporation, guards the safety of its passengers in every possible way—even against injuries from shattered glass. Its windshield is Duplate, the finest quality laminated *plate* glass. Its side windows and doors are glazed with Duolite, the laminated flat-drawn *sheet* glass . . . The Duplate Corporation provides non-shatter glass to meet every aviation need—from 1/8th inch to ¼ inch in thickness, from 24 to 48 ounces in weight per square foot. Three types of glass, each laminated by the special Creighton process which insures clear vision and permanence of lamination . . . Let us send you samples. Also complete information about these glasses, as well as special *bent* laminated glass for cock-pit *windshields*.

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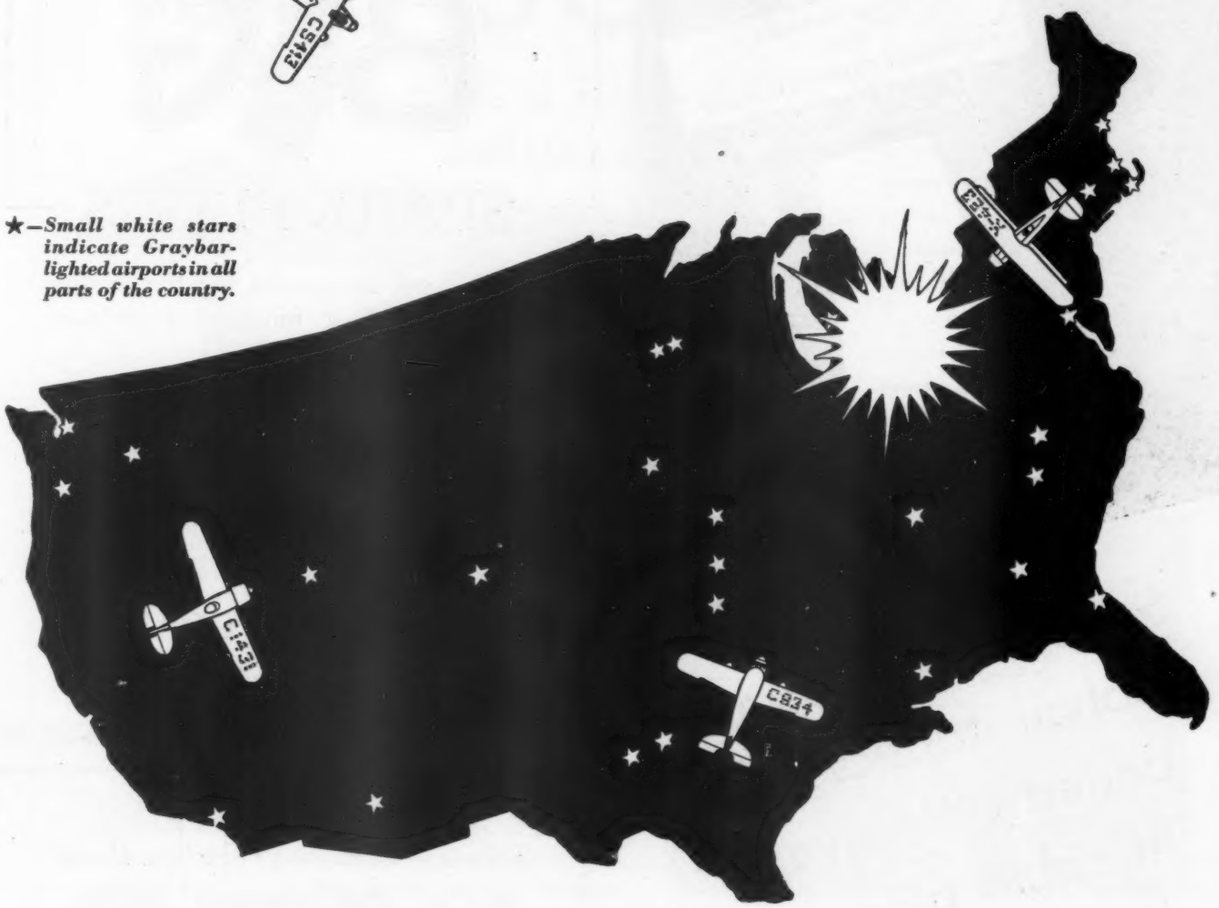
Tune in on the Graybar Hour, 10 to 10:30 Eastern Standard Time, every Tuesday night . . . . . Columbia Broadcasting System.



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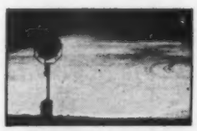
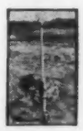
Toledo Hangar





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210 H. P. 4 Place Cabin Plane

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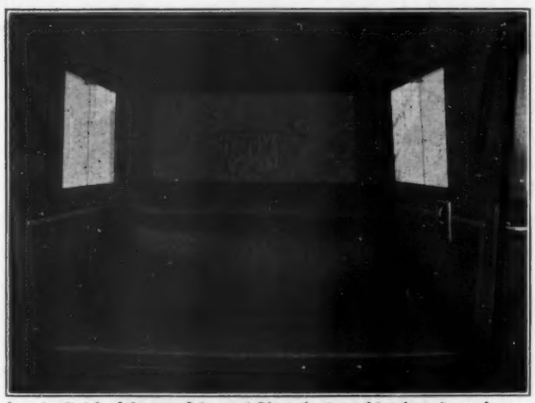
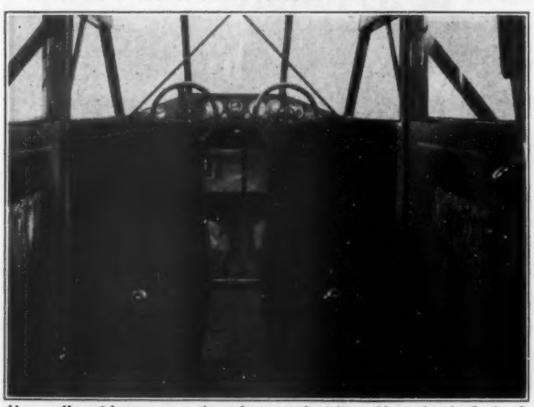
This Stinson plane definitely and exclusively establishes a totally new standard of value. Its price puts it within reach of thousands of new buyers, completely changes the competitive situation, and establishes the selling of airplanes upon a sound and profitable basis. The most important thing in the airplane business today is *people*. High prices have been the main reason that more people have not bought and used airplanes. The alliance of Stinson with the Cord Corporation has made possible a volume manufacturing program resulting in better planes of greater value at sensationally low new prices. Stinson is able to do things never before possible in the aviation industry because of its financial strength, production experience, resources and great buying power. Stinson backs up its dealers with sales help and national advertising that *creates* buyers' demand, quick turnover, volume sales and definite profits. Stinson is doing much more than building airplanes—Stinson is *building a business*. The success of Stinson's program to date is only a hint of what the future holds for those who have the Stinson franchise.



Interior finish of the new Stinson 4-Place Junior cabin plane is similar to that of a fine motor car. Cushions are deep and luxurious. Cabin is ventilated, sound proofed and equipped with two hot air heaters.



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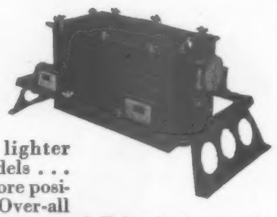

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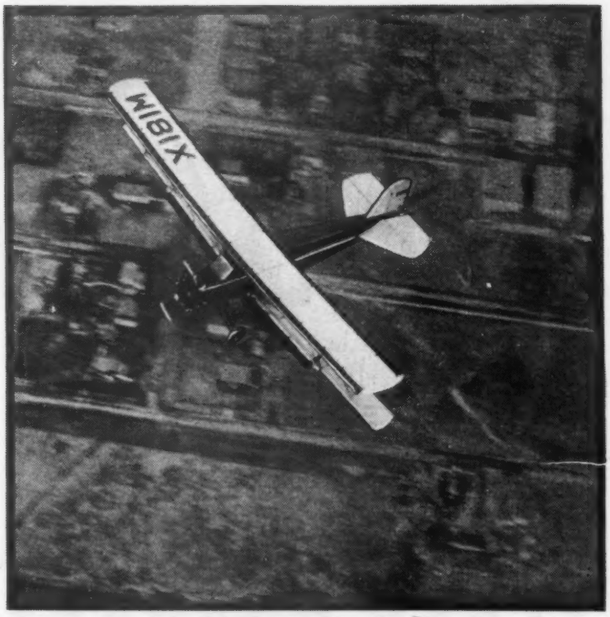

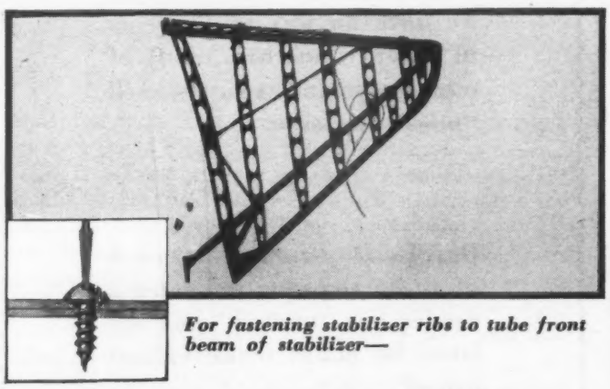

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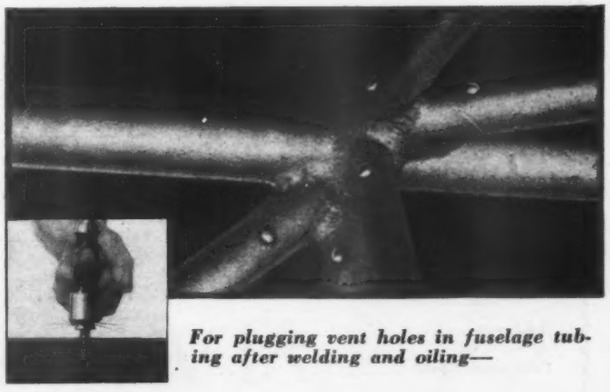

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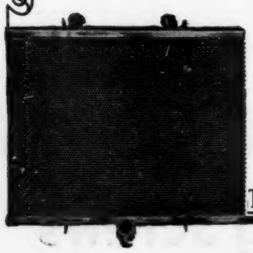

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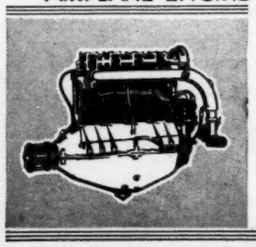

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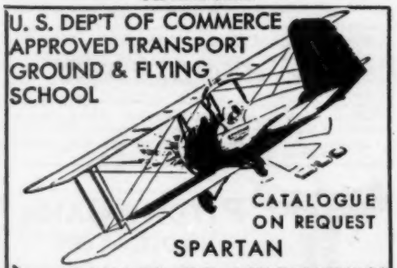

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FOR SALE—Waco-10, A-1 condition. Price $1,475. Will deliver for expenses. B. H. Russell, Caro, Mich.

FOR SALE—One 60 hp. LeBlond engine, five Velie M-5 engines. Very low price for quick sale. Also one airplane with 60 hp. Velie motor. Golden Eagle Aircraft Inc., Port Columbus, Columbus, Ohio.

FOR SALE: New Waco demonstrator, only five hours flying. For quick sale, $2,200. Free flying instruction. Robbins Flying Service, Akron, Ohio.

(Continued on the following page)

FOR SALE
4-Passenger Fairchild Cabin Plane with Wright Whirlwind Motor.
We will sacrifice for immediate sale FC-2 Fairchild with J-5 AB Wright Whirlwind motor. Ship has had 300 hours service, but motor has had complete overhaul at Wright service shop and is in excellent shape. Ship is completely equipped.
Price $3,500 Cash
REGISTER AND TRIBUNE CO.,
Des Moines, Ia.

SACRIFICE SALE
The following equipment must be sold at once.
2—Hisso Eaglerocks, nearly new.
2—DeHaviland Gipsy Moths, one with very little time.
All ships licensed and guaranteed.
E. S. BRAMLEY, Rensselaer, N. Y.

FOR SALE
J-5 NEW STANDARD
Used two months. Special equipment and paint job. Ideal for barnstorming, cross country or blind flying. 90 gal. tanks. Four passengers and pilot. Heywood starter, brakes, covers, tools. Dual controls.
Price $5000
ARTHUR MENKEN
34 W. 52nd St., New York City.

Better Buys in Better Used Airplanes

Waco 10 OX5, 1929, $1,575.
American Eagle, Kinner, 1929, $2,600.
American Eagle OX5, 1928, $1,450.
American Eagle J6-165, new, $3,775.
American Eagle Touroplane, Kinner, 1929, $3,500.
Travel Air, OX5, 1928, $1,450.
Travel Air, J5 Biplane, 1929, $6,350.
Travel Air, J6 6 pl. Mono., 1929, $8,950.
Stearman J5, night flying equip., 1929, $5,500.
Swallow TP, OX5, almost new, $1,350.
Swallow TP, OX5, 1929, $1,300.
Cessna Converted Anzani 120, new, $3,500.
Kari-Keen Velie M5 (not licensed), $1,200.

All above ships licensed and in A-1 condition. — We have others. — If you have a ship for sale, send for our Listing Blank. Write, wire or phone.

The Wichita Airplane Brokerage Co.
916 Brown Building, Wichita, Kansas

SEARCHLIGHT SECTION

EMPLOYMENT and BUSINESS OPPORTUNITIES—USED and SURPLUS NEW EQUIPMENT

UNDISPLAYED—RATE PER WORD:

Positions Wanted. Positions Vacant, and all other classifications, excepting equipment, 10 cents a word, minimum $2.50 an insertion; 15 cents a word if a box number address care of any of our offices is used.

Proposals. 40 cents a line an insertion.

INFORMATION:

Box Numbers may be in care of our New York, Chicago or San Francisco offices.

Discount of 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$6.00 an inch
4 to 7 inches..... 5.75 an inch
8 to 14 inches..... 5.50 an inch

Other spaces and contract rates on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

FOR SALE

(Continued from preceding page)

FOR SALE: Small quantity of brand new helmets and non-shatterable goggles. Bargain for quick sale. Artas Sales Co., 2219 Ohio Ave., Cincinnati, Ohio.

HISSO 180 hp., new condition. Best reasonable cash offer. Rodeghier Motors, Joliet, Ill.

1927 L.S.5 fuselage with steel landing gear, center-section, tail surfaces and right wings. Bargain $125. K. Sherwood, Route 1, Lincoln, Neb.

LINCOLN Sport Plane, new, uncovered, first class workmanship. Anzani motor mount. Only $250 which is hardly the cost of the material. Will crate. Charles Vaccaro, 41 Vee Street, N. W. Wash., D. C.

MAGNETOS—Brand new Simms 8-cylinder for Curtiss, OXX-6, Hisso, and others. Each $22.50. Parts for all kinds of magnetos. Charles Stern & Co., 817 Washington Blvd., Chicago, Ill.

ONE new Eaglerock with landing gear and one set of new EDO pontoons with Hisso or OXX 6 motor for $1900; 5 Hisso motors just overhauled with new parts, $1875 for the five motors. New Orleans Air Line, New Orleans, La.

OX-5 Canuck, completely rebuilt from stem to stern less than a year ago, with new covering throughout. Motor turns 1,400 on ground. Ship always kept in hangar. A bargain at $900. Joseph Kenney, 208 S. Wilbur Ave., Syracuse, N. Y., or see Manager, Syracuse Airport.

New "SEARCHLIGHT" Advertisement

must be received by 10 A.M. Monday to appear in the issue on the following Saturday

Address copy to the Searchlight Department

Aviation

Tenth Ave. at 36th St., New York City

FOR SALE

FOR SALE—Bargain prices; brand new OXX-6 Curtis motors; government rebuilt OX-5 motors and spare parts for same; motors shipped with privilege of inspection. Grant Marine Motor Co., 827 Whittier, Detroit.

PARACHUTES, new and used, rope ladders for stunt men, etc. Specify weight. Thompson Bros. Balloon and Parachute Co., Aurora, Illinois. Established 1903.

RYAN Brougham in good condition, motor recently overhauled. Bargain prace. Cleveland Pneumatic Co., Cleveland, Ohio.

STINSON Detroiter, 8-place ship, 425 hp. Wasp used approximately 50 hours. Good as new. Bargain. Must sell. P. O. Bacon, 1579 East Milwaukee Ave., Detroit.

TRADE

TRADE: Guaranteed mortgage, 6%. Due 14 months. Also cash, for modern 2- or 3-place open or 6-place cabin. Submit particulars. Palisades Development Corp., 1457 Broadway, New York City.

EQUIPMENT WANTED

WANTED—For Waco (10 or 90) one upper or lower right wing. Also set of tail surfaces. Robert Sawyer, Landing Road, Rochester, N. Y.

WANTED: Heath-Henderson motor complete with propeller and hub. Labette County Community High School, Altamont, Kansas.

WANTED: Light motor, air cooled preferred, complete with propeller, first-class condition. Must be low priced. Write all details first letter. Joe Marshall, Madill, Oklahoma.

WANTED: Lower right wing for long wing Eaglerock. Also, we have Eaglerock fuselage, empenage and wires for cash. 215 Lark St., Rochester, N. Y.

WANTED: Upper and lower left wings and ailerons for Waco 10. Cover no object. Wings must pass Department of Commerce inspection. State everything in first letter. Price must be right. Hooten Aircraft Co., 115 S. 9th St., Springfield, Ill.

WANTED: Waco 9 fuselage on front half. Must be okay and cheap for cash. Or will sell parts I have or trade for good OX-5 motor. E. Burlingame, 1459 No. Halton Ave., St. Paul, Minn.

POSITION WANTED

TRANSPORT pilot, open and closed rating, 1,000 hours, college education, engineering, age 26, desires connection as pilot or pilot-salesman. Three years' sales experience. Excellent references. At present located in New York City. PW-501, Aviation, Tenth Ave. at 36th St., New York City.

For Sale . . . . . .

3-PLACE 165 H. P.

Wright J-6 Challenger

This ship has had only 200 flying hours and due to faulty paint job has been completely recovered.

The engine has just had a complete overhaul. The ship is in every respect equal to new.

It is equipped with steel propeller, brakes, air-speed indicator, compass, dual control, front instrument board for instructor and baggage compartment. Cost new $6,575.

FREE INSTRUCTION

for limited commercial license to purchaser.

Price NOW $3,995

Westchester Airport

Armonk, New York.

Tel. Armonk Village 309.

New York Office—Chanin Building

Tel. Caledonia 6188

Gipsy Motor, English Make

perfect condition. Three hundred hours' total, one hundred since overhaul, less cowling and prop. Will guarantee condition. Best offer takes it.

FLYERS INC.

Watervliet, N. Y.

2 CURTISS SEA GULLS

Both 4 place licensed ships in perfect condition. Have had the best of care, and always kept in hangar at night. Motors equipped with electric starters. Also extra motor for each plane. Prices $4,000 and $5,000.

Curtiss Air Station, Inc., Atlantic City, N. J.

FOR SALE AT REDUCED PRICES

3—Uncrated Wright J-5 Engines,
1—Wright J-5 Engine overhauled after 40 hours, and
3—Wright J-5 Engines with 183 hours each.

New and used Wright J-5 Steel and Micarta Propellers, and a miscellaneous assortment of latest type instruments.

For further information write or wire.

Stinson Aircraft Corporation

Service Department, Wayne, Michigan

FAIRCHILD 71

Seven place Wasp ship, fine condition, motor recently overhauled at P. & W. Service Station. Priced for quick sale at $9,850. Wire or write

W. H. MILLHAEM

Municipal Airport, Des Moines.

FOR SALE

USED SHIPS

of all types. Land, Water and Amphibians.

LIST YOUR USED SHIPS WITH US.

FS-490, Aviation,
Tenth Ave. at 36th St., New York City

DETROIT AERO MOTORS CO.

5055-59 Townsend Ave., Detroit, Mich.

FOR SALE

2—J-6 five cyl. Wright Whirlwinds.
2—J-5 Wright Whirlwinds.
1—Kinner, 2—Warner-Scarabs.
1—Sixty Velie, 1—OXX6 Curtis.
3—OX5 Curtiss.

Write for information and prices on motors and J-4 and J-5 motor parts.

FOR SALE

Cheap **New Wasp Stinson,** eight place, electric landing lights, electric starter, night flying instruments, lavatory. Ship has had 130 hours. Also **Curtiss Robin,** excellent condition, never hurt, always kept inside; a snap at $2,000.

Grand Forks Air Transport Co.

Grand Forks, N. Dak.

There is a

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(American Edition)
Aviation
Bus Transportation
Chemical and
Metallurgical Engineering
Coal Age
Construction Methods
Electric Railway Journal
Electrical Merchandising
Electrical World
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Food Industries
Power
Radio Retailing
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For advertising rates and other information on any or all of these publications, address

SEARCHLIGHT DEPT.

Tenth Ave. at 36th St., New York

POSITIONS VACANT

MECHANIC wanted. Must be competent, reliable and steady; novices save stamps. State salary and references first letter. Robbins Flying Service, Akron, Ohio.

WANTED: Transport pilot ground school instructor who is capable of rating a ground instructor's license. Army training preferred. Give full particulars first letter. P-503, Aviation, 520 No. Michigan Ave., Chicago, Ill.

POSITIONS WANTED

LICENSED aeroplane and engine mechanic, nine years' experience, desires position with reliable concern, steady employment, good pay. Will travel or locate anywhere. PW-505, Aviation, Tenth Ave. at 36th St., New York.

LIMITED commercial pilot, Curtiss. Married, age 29; 8 years' selling and insurance experience. Desires position anywhere. PW-506, Aviation, Tenth Ave. at 36th St., New York.

LIMITED commercial pilot, graduate of Parks Air College. Time in open and cabin planes. Desires position with reliable concern or individual. Best references. Allen Holdgate, Nantucket, Massachusetts.

LIMITED commercial, Yale graduate, unmarried. Experienced test-flying engines. PW-504, Aviation, Tenth Ave. at 36th St., New York.

LIMITED commercial pilot, Embry-Riddle graduate, 110 hours; passenger hopping experience with small field. Will go anywhere. D. B. McNamee, 807 Purcell Ave., Cincinnati, Ohio.

PILOT, unlicensed, 65 solo hours, desires position with concern to demonstrate planes. Can furnish best of references. PW-502, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot. Age 29, 300 hours cross country, operating his own OXX-6 Travel Air on schedule time over most of United States in last year and half. Looking for steady connection. My ship is available. Arnold Bayley, 939 Fox Chase Road, Philadelphia, Pa.

TRANSPORT pilot, 815 hours, open and cabin ship. Good cross country experience. Night flying and some tri-motor time. Excellent references. PW-494, Aviation, 520 No. Michigan Ave., Chicago, Ill.

TRANSPORT pilot desires employment. Single and will go anywhere, can produce references of an unusual character. Box 3156, Municipal Airport, Tulsa, Okla.

TRANSPORT PILOT

And ground school instructor, Curtiss graduate, A. & E. mechanic, 32, single, good character, 265 hrs. on open and cabin ships, cross country, and instruction work, desires position with reliable concern or private owner. Best references.

PW-487, Aviation
Tenth Ave. at 36th St., New York City

AVIATION MEN!

are you employed? If not this agency may be able to place you immediately with one of the companies needing a man just like YOU. Send for application at once enclosing $2 registration fee which is returnable on demand if we do not place you. Companies we are in touch with pay $30-$150 per week.
Park Row Employment, 15 Park Row, N. Y.
Country-wide Aviation Specialists.

Do You Want A Good Position?

We secure positions for hundreds of people a year. Perhaps we can assist you immediately. We are in touch with leading aviation companies all over the country. Regardless of what position you want—flight or ground—whether experienced or inexperienced. Write or wire at once for application blank.

Wright Employment Service
Jamaica, Long Island
Pioneers in Aviation Employment

POSITIONS WANTED

TRANSPORT pilot desires position. Clean record and excellent references. Age 25. U. S. naval aviator with over 600 hours in military and commercial planes. W. R. Webb, Chief Pilot, Flying Dutchman Air Service, Buselton Pike, S. Somerton, Phila., Pa.

TRANSPORT pilot, class 1-A, age 22, single, 300 hours, no accidents; plenty of storming experience. Will fly private or commercial. Good habits. Best of references. Write me. Lucien Metzger, Winchester, Ill.

SALESMEN WANTED

Salesman

Man who has had experience in selling aircraft around New York City and vicinity to connect with a well-known manufacturer and who has had selling experience and is willing to sell on commission basis only. Answer giving experience, references and compensation desired. SW-454, Aviation, Tenth Ave. at 36th St., New York.

MISCELLANEOUS

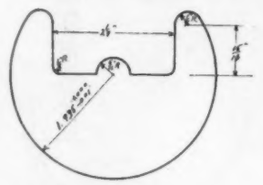
MECHANICS. A tool you have always needed for adjusting the pin electrodes on B. G., Champion and other spark plugs. Send $1.75 today. P. O. Box 768, Ken Mattingly, Orlando, Fla.

3,000 Aerial Photographs

of beautiful estates and public buildings, together with complete aerial photographic business established for ten years for sale at great sacrifice.

G. B. SMITH,
76 William St., New York City John 3627

Aeroplane Stampings in small lots



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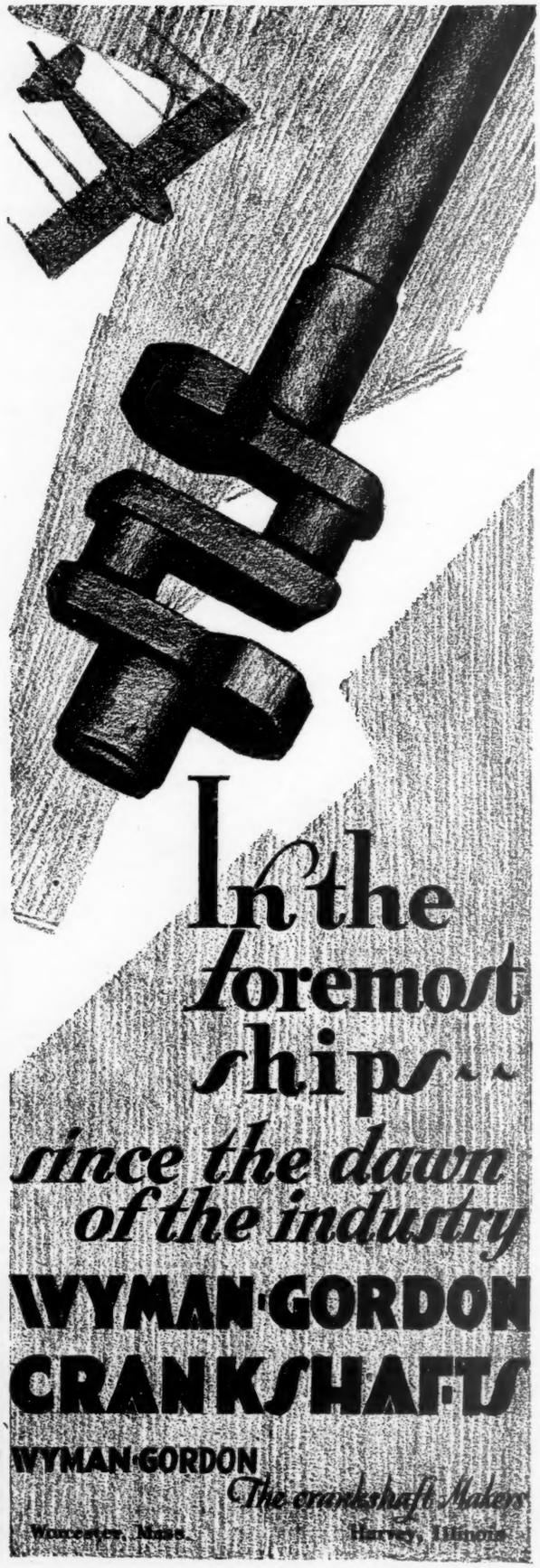
Blanks of any size or shape and of any material can be furnished to order in proportion to the above price. Forty-eight hour service on such work when required. Send your prints or sample blanks for quotation.

DAYTON A. ROGERS
4104 E. 27th St., Minneapolis, Minn.

AVIATION WELDERS ARE NEEDED

The only EASY WAY to get into the world's most interesting and best paid business. In four weeks we fit you to step into aircraft factory jobs leading to BIG PAY immediately after graduation. Write TODAY for our latest offer to pay your railroad fare to Milwaukee. You may earn your board and room working in our shops while learning.

Industrial School of Welding
Department AB, 1350 Burnham Street,
Milwaukee, Wisconsin.



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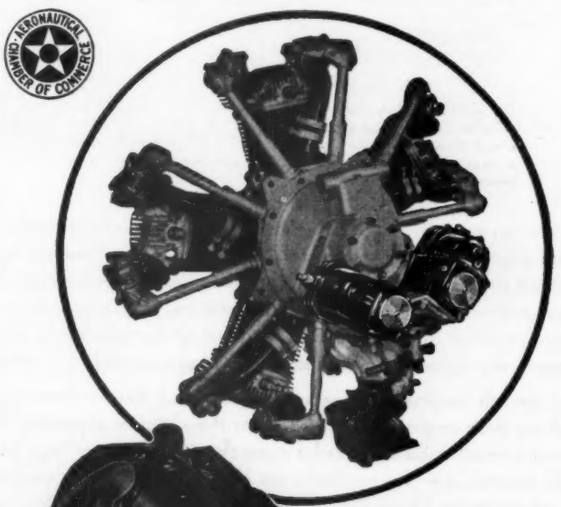
SCINTILLA
AIRCRAFT MAGNETOS

In all outstanding flight achievements Scintilla Aircraft Magnetos continue to prove their stamina and dependability. Chosen by Aeronautical engineers, Scintilla Magnetos are standard equipment on the majority of modern American Aeronautical engines.

These Magnetos are obtainable for engines of from one to eighteen cylinders.

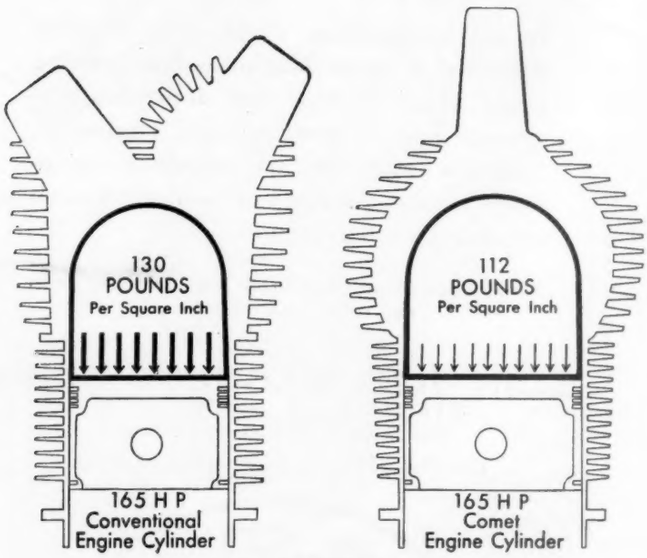
SCINTILLA MAGNETO CO. Inc
SIDNEY - NEW YORK
Contractors to the U.S. Army and Navy
(Division of Bendix Aviation Corporation)



Scintilla Magnetos on the Lambert 90—the engine used in the Barling NB-3 light airplane in its record breaking altitude flight during the St. Louis Show.

DEPENDABILITY
SIMPLICITY
ACCESSIBILITY

COMET "low m. e. p."



"Force is Pressure Multiplied by Area"

The above sketches show how the Comet low m. e. p., large displacement cylinder develops the same power with less strain than another cylinder of less displacement and higher m. e. p. But Comet weight per horsepower is no greater, because simplified design saves weight which is put back on wearing parts.

—FOR SAFETY
—FOR DURABILITY
—FOR ECONOMY

Roll your Comet-powered plane out of the hangar—load up, and fly away. Do it every flying day for a year—or more. Have the valve clearances adjusted every 50 hours—or do it yourself—it's easy. Take care of oil and greasing. You will not need an overhaul for 300 to 500 hours. Durability (economy) is another advantage of Comet power.

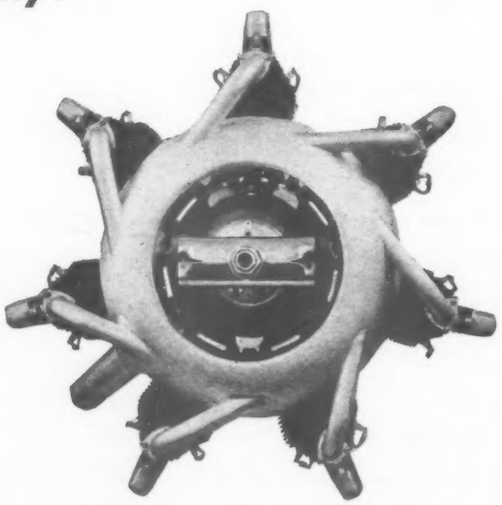
Why?

When an engineer designs an automobile engine he gives the wearing parts plenty of reserve strength so they can do their work at ease, without strain. He also designs for low m. e. p. (brake mean effective pressure)—as low as 100 pounds pressure per square inch—so the engine *cannot* be made to work as hard as it *could* work. That is one reason why automobile engines last a long time with low upkeep cost.

But aircraft engine designers have followed the wartime practice of making their engines work at or near their utmost capacity. Conventional aircraft engines, without supercharging, run as high as 120 to 135 pounds per square inch, on the theory that the utmost power must be obtained from the least weight of metal. So durability—reserve strength—is sacrificed for maximum attainable power. The result is expensive maintenance and parts replacements, with the possibility of failure and resulting delays.

Comet sacrifices neither durability nor performance. Durability is attained by building into the vital parts of the engine—the wearing parts—the weight saved in the simplified valve mechanism and cylinder head. Performance is accomplished by providing an unusually large cylinder displacement which permits holding the brake mean effective pressure to a modest figure—112 pounds per square inch.

Durability—another reason why Comet owners are



Comet Engines will be displayed at Madison Square Garden and in the Park Central Hotel lobby during the New York Aircraft Salon, May 3-10.

at ease in the air

COMET ENGINE CORPORATION

MADISON, WISCONSIN, U. S. A.

Address Inquiries to Room 102—215 So. Dickinson Street

Comet aircraft engines are manufactured at Madison, Wisconsin, under the direction of the Gisholt Machine Company, for 40 years builders of fine machine tools in use throughout the world.

GUARDIANS
OF OUR SKIES

THE HAWK

SWIFT and relentless bird of prey — streaking aloft on the wings of the wind to convoy a fleet of bombers over the lines, or to repel, with savage fury, an unwelcome visitor at twenty thousand feet.

THE FALCON

SO versatile that it is equally effective as a ground attack plane, swooping low over the tree tops and leaving swift destruction in its wake, or as an observation plane, cruising miles high to ferret out enemy secrets with an all-seeing camera, or to coordinate artillery fire by radio.

BOTH

STANDARD equipment of the U. S. Army Air Corps, both developed under the Curtiss Group Engineering System, in close cooperation with Army Air Corps Engineers, both 100% Curtiss designed, constructed, powered.

CURTISS AEROPLANE & MOTOR CO., Inc.

Offices: Garden City, N. Y. · Factories: Garden City, Buffalo, N. Y.

A DIVISION OF CURTISS-WRIGHT CORPORATION

TACOMA PUBLIC LIBRARY
TACOMA WASH

speaking of *Records*...

THE "WASP" GATHERS IN SIX MORE

LEE SHOENHAIR has just established six new world's speed records for class C airplanes. He flew the "Wasp" powered Lockheed Vega monoplane "Miss Silvertown," owned by the B. F. Goodrich Rubber Company. These new marks are as follows:

WITH 1000 KILOGRAMS LOAD

1. Distance of 100 kilometers at 175.997 miles per hour
2. Distance of 500 kilometers at 168.114 miles per hour
3. Distance of 1000 kilometers at 152.702 miles per hour

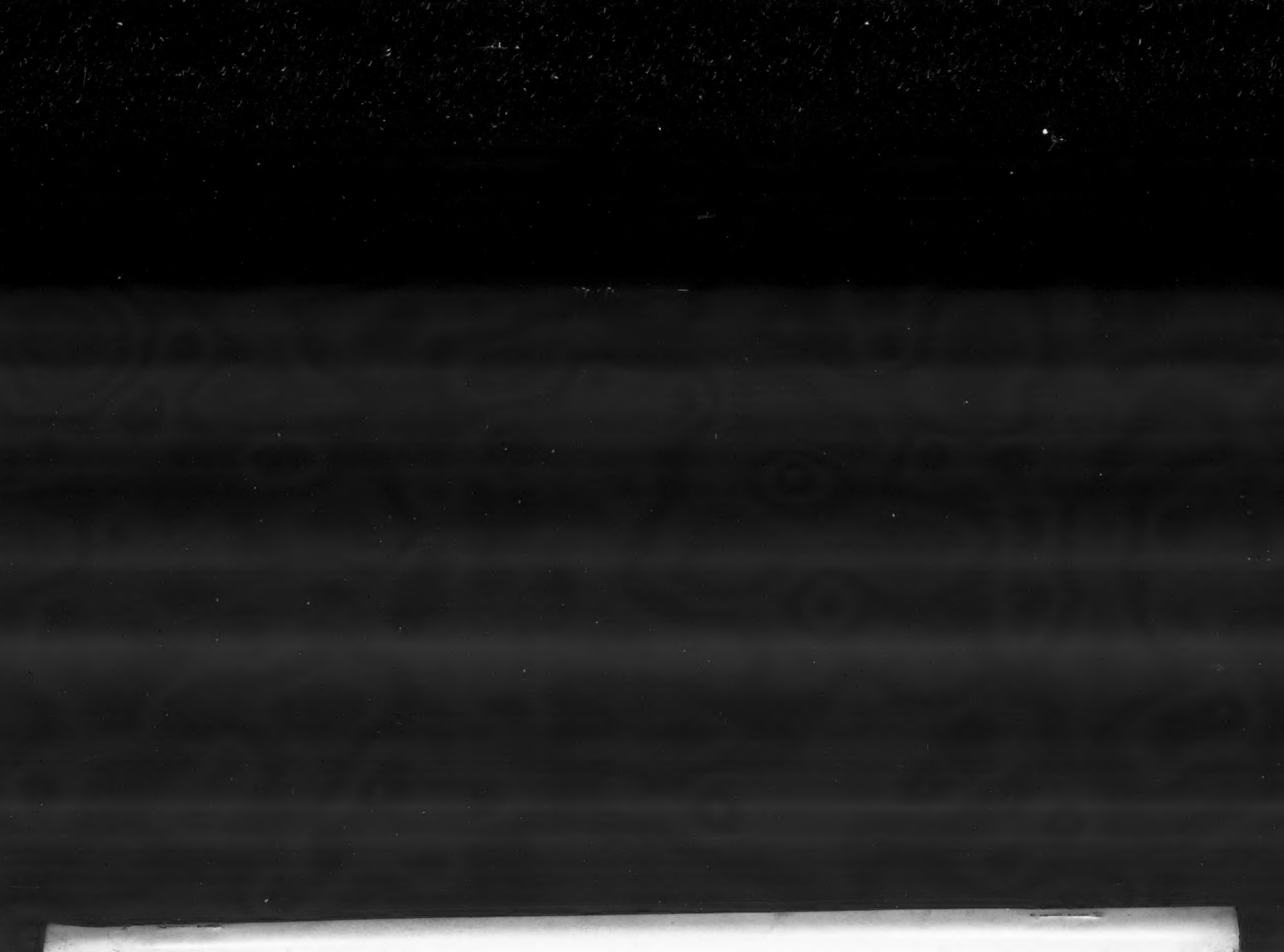
WITH 500 KILOGRAMS LOAD

4. Distance of 100 kilometers at 185.42 miles per hour
5. Distance of 500 kilometers at 171.288 miles per hour
6. Distance of 1000 kilometers at 152.702 miles per hour

Recognition by the Federation Aeronautique Internationale of these new records will credit the United States with 23 motor flight, heavier than air world's records. Pratt & Whitney will hold 12 of these, or more than half of this country's heavier than air records, and three times as many as are held by any other American aeronautical engine manufacturer.

Not only in the establishment of world's records, but in the everyday carrying of mail, passengers and express, "Wasp" and "Hornet" engines are demonstrating *that dependability* which comes only with proven design and unusual craftsmanship.

THE
PRATT & WHITNEY AIRCRAFT CO.
HARTFORD · · · CONNECTICUT
Division of United Aircraft & Transport Corporation

Manufactured in Canada by Canadian Pratt & Whitney Aircraft Co., Ltd., Longueuil, P. Q.; in Continental Europe by Bavarian Motor Works, Munich; in Japan by Nakajima Aircraft Works, Tokio.

Wasp & Hornet *Engines*